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SEPTEMBER 1946

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6D.

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KP3

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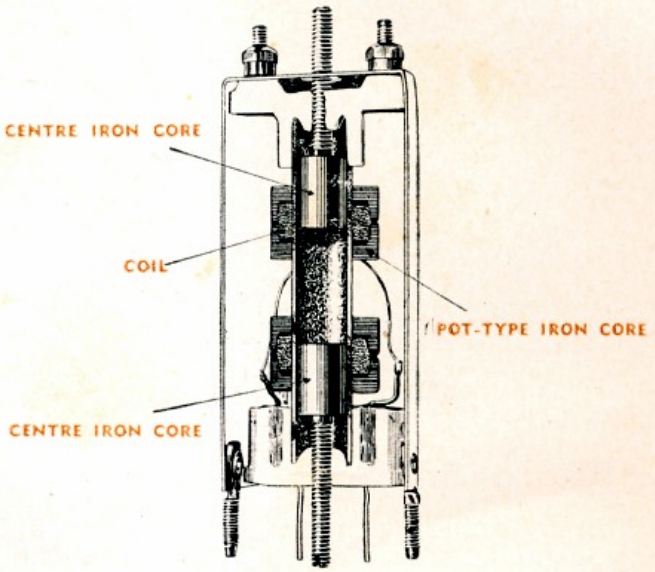

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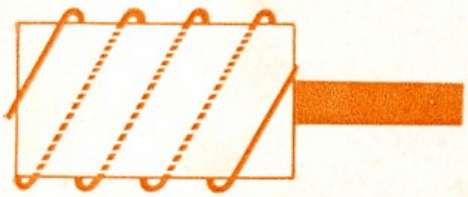

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Editorial

With the re-opening of a fair proportion of the 3.5 Mc. band we can feel at last that the amateur portion of the spectrum is assuming a familiar pre-war appearance again. While we now have portions of each of the pre-war bands back again, some of them are only token allocations and we are still the worst off of any country in which Amateur Radio has been re-instated. Your Federal Executive is doing everything possible to improve this position and on that score there is nothing the average amateur can do to assist.

However on the more general side of Ham activities there is a job, and an urgent one, for every licenced amateur worth his salt. The present outbreak of "piracy" is a very real menace to our hobby and it cannot be eliminated too fast. By no stretch of the imagination can Amateur Radio be blamed for the situation, the gear in practically all cases is Disposals equipment and lack of adequate publicity concerning relevant portions of the Wireless Telegraphy Act is, to some degree, responsible for transmitting equipment being sold to unqualified persons. This aspect has been cleared up satisfactorily and while this should reduce the number of unqualified people buying such equipment in the future, it still leaves a considerable number of active pirates to be dealt with.

So long as these pirates sit down in our bands we have a definite responsibility to eliminate them. Some are active in ignorance of the position, others understand their position perfectly but choose to continue breaking the law. Whether we take it or not so long as they operate in our bands they are a potential danger to us and can only bring disaster on the whole amateur movement. With an attitude of "I might as well be hung for

(Continued on Page 14)

IN THIS ISSUE

CLEARING THE ETHER, Series II, Part V

*By G. Glover, VK3AG

CONSTRUCTION AND OPERATION OF MODERN TRANSMITTER (Continued)

Electrical Aspects of Frequency Multiplier:—

(a) The circuit is as illustrated in Figure 8.

(b) Frequency Range.—Unit provides multiplying factors of 1, 2, 4, 6 and 8 covering 1.75, 3.5, 7, 14, 21 and 28 Mc. bands. Frequencies from 1.5 to 4 Mc. are covered with 1 : 1 ratio.

(c) Band switching is effected by three section, 5 position, 2 pole Ceramic switch. Action of switch being as follcws:—

Section 1(a) Connects R.F. input direct to output for 1 : 1 ratio and to transformer socket (T.S.1) for remaining ratios.

Section 1(b) Completes V.3 cathode circuit in positions 2 to 5.

Section 2(a) Energises V.4 in positions 3 and 5.

Section 2(b) Completes V.5 cathode circuit in position 4.

Section 3(a) Selects input and output of V.3, output V.4, output V.5 and output V.6 in that order, commencing from position No. 1.

Section 3(b) Energises V.6 in position 5.

(d) A separate single section switch is employed to "Select Output," that is to say, exciter output can be diverted from one channel to another (two channels are incorporated but others may be added if desired), so that more than one set of output stages can be set up. For example, one output may be connected to H.F. Final Stages and the other to V.H.F. Final Stages.

(e) Connections to Ceramic sockets are arranged to provide for use of various types of coupling units, which will be discussed later.

(f) Input circuits of all tubes are arranged so that grid circuit is complete even if the transformer is out of socket.

(g) Cathode circuits of all tubes are opened to render tube inoperative when not required.

(h) Cathode circuits are arranged so that meter shunt is always earthed and not thrown into the air when cathode circuit is opened; otherwise the meter would have practically the full anode voltage applied to it when metering switch was operated.

(j) All by-pass condensers must be capable of withstanding full H.T. voltage while cathode circuit is open. All leads should be as short as possible.

(k) Cathode resistors provide cathode bias to limit anode and screen currents when excitation fails or transformer is absent.

(l) Grid resistor provides bias more or less in proportion to excitation once the positive region has been reached.

(m) All grounded components should be returned to common point associated with each tube, and only one direct earth should be made to metal plate unless the presence of parasitics demands otherwise.

(n) Should parasitics be encountered correct treatment will readily eliminate same. This subject will receive special attention under the heading of "Final Amplifiers."

(o) The switching of links will vary the tuning of the transformers slightly; but as the frequency is merely adjusted for operation in optimum sector of the band, the alteration in resonant frequency should not affect operation.

* Glorad Engineering Services.

Mechanical Aspect of Frequency Multiplier

Remarks in connection with B.F.G. regarding shortness of leads, general set up, etc., apply equally as well to the Frequency Multiplier, and Figures 6a and 6b illustrated set up and lay out of the mounting plate.

Electrical Aspects of Tuned Transformers

This calls for a discussion regarding means of obtaining band-pass. A subject which is usually associated with receivers in the minds of most Hams.

There are various ways of securing uniform transmission of a band of frequencies, namely:—

(i) Near Resonant Choke.
(ii) Coupled Circuits (Cascade).
(iii) Circuits damped by shunt or series resistance.
(iv) Very low L/C Ratio.
(v) Insertion of series resistance in link or capacity coupled circuits.
(vi) Use of band-pass filters.
(vii) Stagger tuning of circuits and stages.

Near Resonant Choke (i).—Strictly speaking we can hardly classify this method as "Band-Pass," but it represents a very economical method of achieving transmission of wide band of frequencies at low efficiency. In practice choke is inserted in the anode circuit of one tube and capacity coupled to the grid of the next stage. The inductance value of the choke is so chosen that, the distributed capacitance of the circuit, inter-electrode capacities of both tubes, and inherent capacity of the choke iself, cause the circuit to resonate at a frequency twenty per cent. lower than the lowest frequency to be transmitted. Under these conditions the circuit present slowly falling impedance to all frequencies above the resonant frequency. Thus output, although not very high in the first place, decreases slowly over a wide range of frequencies. In other words, circuit acts as low Q single section high-pass filter.

Coupled Circuits (ii).—The double peak caused by the interaction of two coupled tuned circuits provides another means of securing band-pass. In this case the band width is determined by the tightness of coupling; but the useful width is limited by the sag in the centre of curve as the coupling is increased.

Circuit Damped by Shunt or Series Resistance (iii).—Reference to the formula for determining the Q of circuit, namely, $Q = XL/R$, indicates that the higher the effective series resistance, the lower the Q, hence the "flatter" is the resonance curve. A shunt resistance loads or damps the circuit and its effect is equivalent to that of increasing the series resistance. Sometimes coils are wound with resistance wire to achieve this effect.

Very Low L/C Ratio (iv).—This effectively reduces the Q of the circuit and can be likened to (iii) in its result.

Insertion of Series Resistance in Link or Capacity Coupled Circuits (v).—This method has been successfully employed to damp output over wide range.

Use of Band-Pass Filters (vi).—Band-pass filters consisting of two or more shunt circuits in cascade, series of "Pi" or "T" Sections. As these types are beyond the scope of this series of articles, we will not dwell on the subject.

Stagger Tuning of Circuits and Stages (vii).—Undoubtedly many Hams have at sometime or other found it necessary to stagger tune the primary and secondary of an I.F. transformer associated with a super-heterodyne receiver, for the purpose of curing oscillation, that is to say it has been necessary to reduce the Q of the circuit. By employing this method of reducing the Q we also increase the band-pass, by virtue of the fact that we move

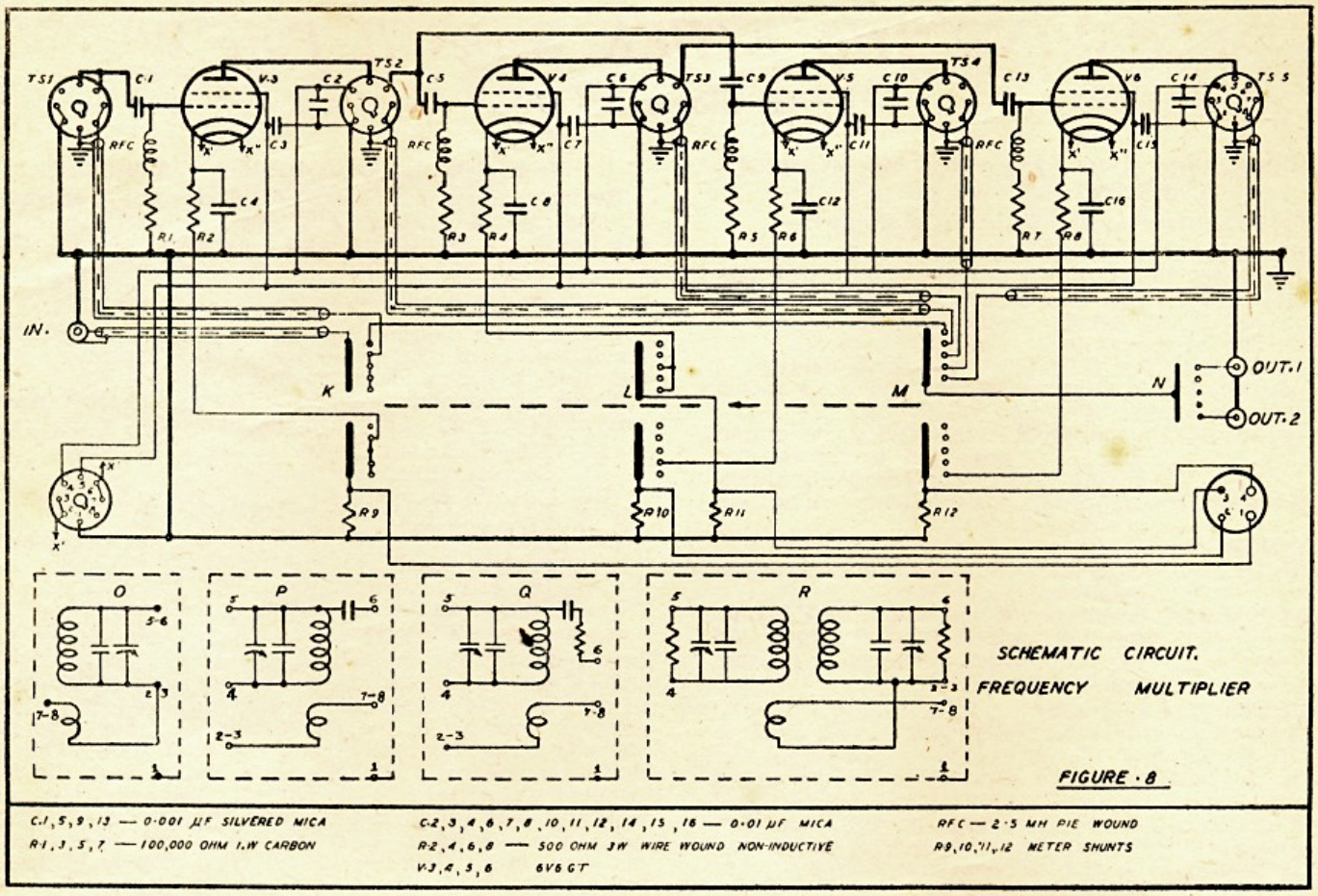

FIGURE · 8

the resonant frequencies of primary and secondary further away, and on opposite sides, of the centre frequency. Where several stages are used in cascade we are able to further enhance this effect by stagger tuning the stages. This is accomplished by keeping pass bands of each stage to width where centre sag is small and adjusting each stage around different centre frequencies, spread over the band we desire to cover.

Mechanical Aspects of Coil or Transformer Units

All units follow the same general design as units employed with B.F.G.

Resume'

Before leaving the subject of Exciter Unit, the writer would again stress the point, that the unit used as an example represents one method of attacking the multi-channel problem. The reader should incorporate those ideas which appeal to him, in a unit adapted to both his purse and existing equipment, bearing in mind the ultimate aims of the unit.

The main object of this series of articles is to bring before the reader various methods of attacking a problem and the pitfalls likely to be encountered with each method. As an experimenter the Ham should plan his equipment with a view to carrying out the maximum number of experiments with minimum expenditure of cash and energy. For this reason inserts O, P, Q and R of Figure 8 depict various types of circuits suitable for application to the unit described. O is the input and output transformer, P standard capacity-coupled unit, Q series resistance damped capacity-coupled unit, and R tuned primary and secondary loaded with shunt resistances, suitable for stagger tuning if required.

POWER AMPLIFIERS

Having obtained the final excitation frequency in the exciter unit, the next consideration is how to amplify the desired frequency and apply same either to the aerial system or a further stage of amplification. For the purpose of this discussion we will assume that a further stage of amplification is to be employed. This will enable us to investigate a multiplicity of problems, namely:—

(a) Inter-stage Couplings.
(b) Harmonic Amplification.
(c) Harmonic Elimination.
(d) Parasitic Suppression.
(e) Output Couplings (to aerial and feeder systems).
(f) Neutralisation.

(a) Inter-stage Couplings

In previous sub-section we covered the problem of securing uniform transmission of a band of frequencies, the object being to reduce the number of controls to a minimum, and at the same time secure a wide range of excitation frequencies. In the case of power amplifiers, however, the object is to secure the maximum amplification of the desired frequency, and maximum attenuation of all unwanted components; therefore, inter-stage couplings must provide efficient transfer of power from one stage to another at resonant frequency.

Broadly speaking, coupling methods may be divided into three general classes, Capacitive, Inductive and Transmission Line.

The governing factor in the coupling of one stage to another is the difference in impedance of the anode circuit of the driving stage and the grid circuit of the driven stage. The problem is further complicated if push-pull stages are employed.

Capacity Coupling.—This method is the most simple. Figure 9 depicts various methods of coupling two stages. In Figure 9a the coupling capacitor C has two functions:—

(i) To isolate the grid circuit from D.C. voltage of series-fed anode circuit.
(ii) To provide R.F. coupling. R.F. Choke isolates the

grid from ground and provides channel for operating bias.

The coupling condenser must be capable of withstanding H.T. voltage, plus grid bias, plus super-imposed R.F. current—refer to remarks covering condenser ratings in Part 2.

Figure 9b illustrates the use of shunt-fed driver anode circuit. In this case the tuned circuit is in the grid circuit of the driven stage, and as in the case of Figure 9a excitation is adjusted by varying the location of tap on the coil.

Both circuits quoted to date have one very bad inherent fault, that is, the inter-electrode capacities of both tubes are connected across the tuned circuit, as a result, L/C ratio of driver tank must be reduced thereby lowering the efficiency at V.H.F. Furthermore, the variable tap is often responsible for parasitic oscillation in the amplifier. High harmonic content in the output is also a common occurrence in amplifiers employing this method of coupling.

Figures 9c and 9d employ circuits designed to avoid the paralleling of input and output capacities of driven and driver stages. In both cases the mid-point of the tank circuit is "cold," in so far as R.F. is concerned; hence, the tank is "hot" at both ends and by connecting the tubes to opposite ends of the coil the respective inter-electrode capacities are across opposite ends of the coil. As these two capacities are then effectively in series, considerable improvement in L/C ratio results.

The main differences between Figures 9c and 9d is the method of splitting the tank circuit. In the former excitation is varied by moving the tap on coil, whereas in the latter excitation is controlled by the ratio of C1 to C2. Total capacity being kept constant so as to maintain resonance.

By balancing the driver circuit as shown in Figure 9e a push-pull amplifier can be used. The centre of the balanced circuit is at zero R.F. potential and the ends are at 180 degrees phase difference, the basic requirements for push-pull operation.

Figure 9f shows method of employing split-stator capacitor to furnish balanced ground in driver stage, while an R.F. Choke feeding H.T. to the coil permits coil to assume balanced operating conditions.

In the case of both Figures 9e and 9f adjustment of excitation is effected by varying the position of taps while maintaining equi-distance from centre—more accurately determned by applying Vacuum Tube Voltmeter (V.T.V.).

Figure 9g depicts method applicable to V.H.F. where copper tubing can be employed for coils. This mode of application dispenses with the necessity for coupling condensers, and provides series feed for both driver anode and driven amplifier grid circuits. The inner conductor must have insulation capable of withstanding same stress as the replaced coupling capacitor.

Excitation is varied in the same manner as for Figures 9e and 9f.

Figure 9h illustrates link coupling as used with twisted or balanced pair. The link has many advantages, the foremost of which are:—

(i) The ability to transfer energy between isolated stages without appreciable loss of power.

(ii) Low impedance of link reduces R.F. potential, removing the necessity of conveying energy at high voltage.

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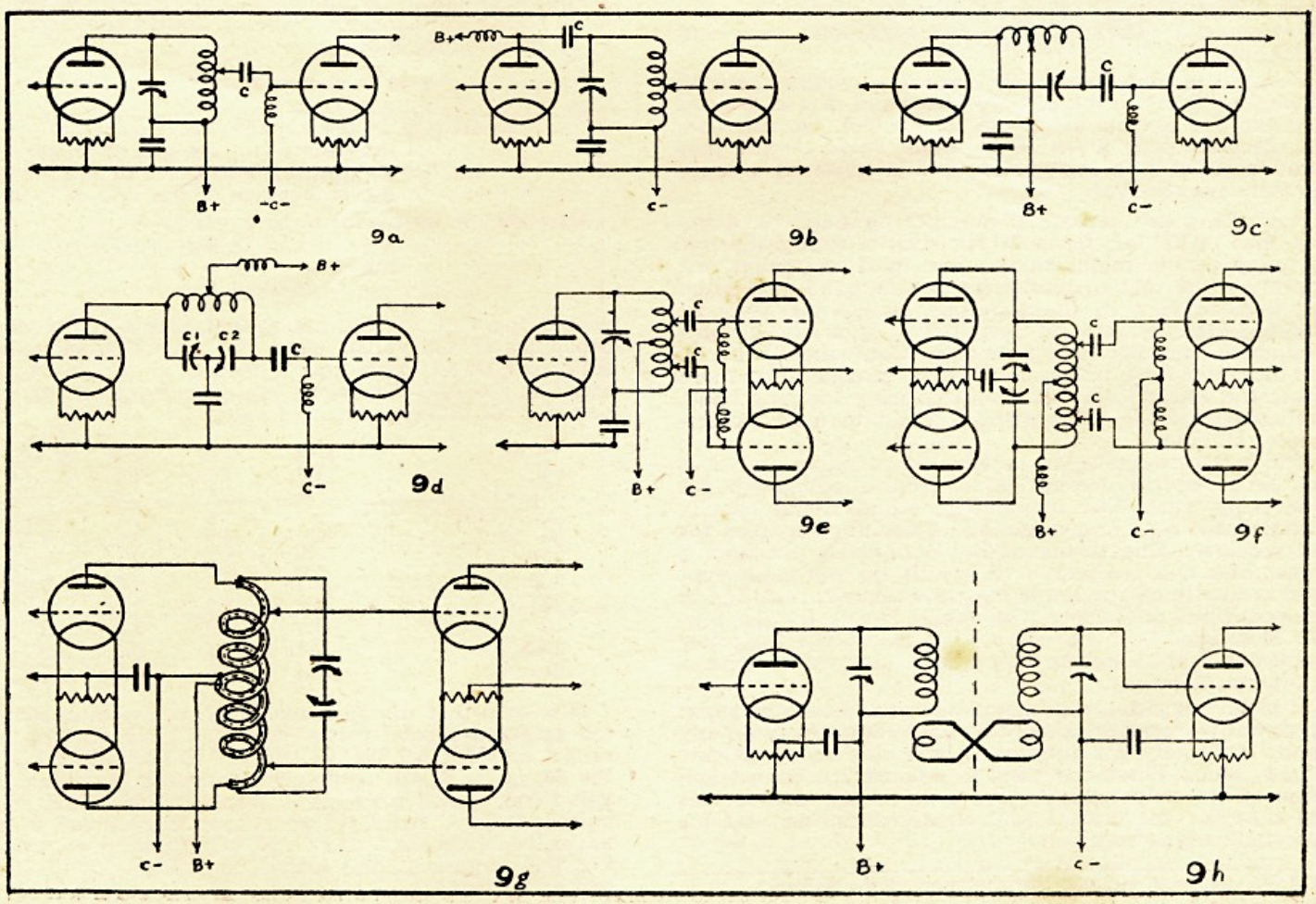


A SIMPLE CIRCUIT FOR THE 166-170 Mcs. BAND

A. F. Nickson, VK3NB*

To those interested in higher frequency work, the band 166-170 Mcs. offers interesting possibilities, as the highest frequency band before the war was 56-60 Mcs. Unfortunately, however, inspection of the various Handbooks and current articles appears to indicate that, while no new technique would be necessary to reach this frequency band, the common type of receiving valve cannot be used satisfactorily. The reason for this is that the electrode capacities of the standard receiving valve are greater than those of the midget type, and as a result it is impossible to reach high values of frequency without using extremely small values of inductance. This leads to further difficulty as all valve leads possess appreciable inductive reactance at high frequencies, which necessitates the use of a smaller value of inductance than appeared necessary at first. This means that both the external capacity and the external inductance must be less than given by the relation—

$$f = \frac{1}{2 \text{ pi } \sqrt[2]{L\,C}}$$

by an amount depending on the type of valve used. By the use of midget valves, the effect of valve capacitance and valve lead inductance is reduced, resulting in external values of inductance and capacitance more nearly in accord with the above relation. After reading of the two stalwarts in Sandringham who have despaired of hearing anyone else on the band it was felt that it would be generally useful to determine whether some of the more common types of receiving valves could be used to attain the desired frequency range with ease and reliability.

Because of unforseen difficulties that might arise in attempting to reach the 166-170 Mcs. band, it was decided to make the circuits as simple as possible. To this end, consideration was given to a single valve circuit that could be used as a self-excited oscillator, or as a super regenerative receiver.

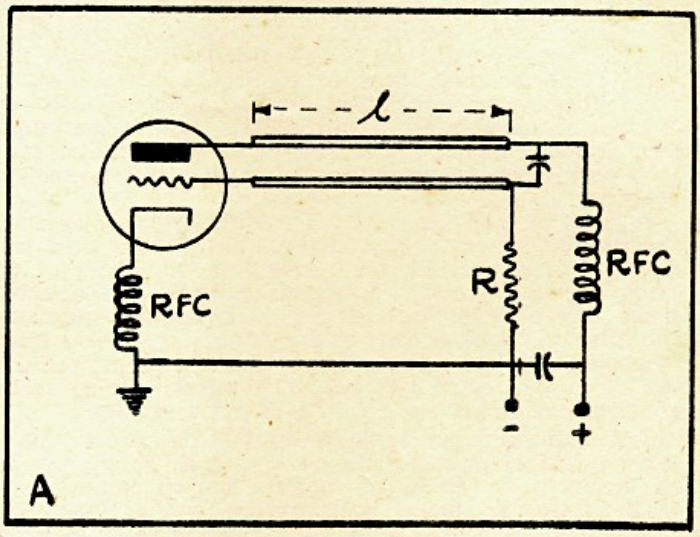
Now there are several advantages obtained by doing this that make this decision not such a retrograde one as many people might think. The most important one appears to be that in pioneering a new band it is often felt that, in view of the uncertain results that may be obtained, the expense of installing a quantity of new equipment may not justify its cost. Consequently if one can use standard valves and parts considerably more interest is likely to be taken in exploring the new band, particularly if the parts can be found in most experimental stations.

The super regenerative receiver is sensitive and does not tune sharply, which is a definite advantage for pioneering work. The modulated oscillator, not heavily modulated is easy to operate, and a useful companion for the receiver. The whole of the equipment for such a transmitter and receiver need not tie up any equipment used normally on the lower frequency bands, resulting in the possibility that those who would like to try the 166-170 Mcs. band but are not willing to rebuild their low frequency transmitter to do so, can now do so with a minimum of outlay.

It is not suggested that modulated oscillators and super regenerative receivers should be used consistently on any band, but solely for pioneering attempts to investigate a new band. When the band is definitely occupied and some of its characteristics are determined, then comes the time for the crystal controlled transmitter and the superheterodyne receiver.

* 18 St. Andries Street, Camberwell, E.6, Victoria.

The simplest circuit that suggested possibilities is shown below. This circuit has the merit that it is about as simple as can be, and because of this is susceptible to mathematical analysis.



For the simplest explanation the circuit can be reduced to an equivalent capacity C and an equivalent inductance L, of such values that

$$C = Cv + Cl$$
$$\text{and } L = Lv + Ll$$

where Cv is the capacity of the valve
Cl the capacity of the line of length l
and Lv is the lead inductance of the valve
Ll the inductance of the line of length l.

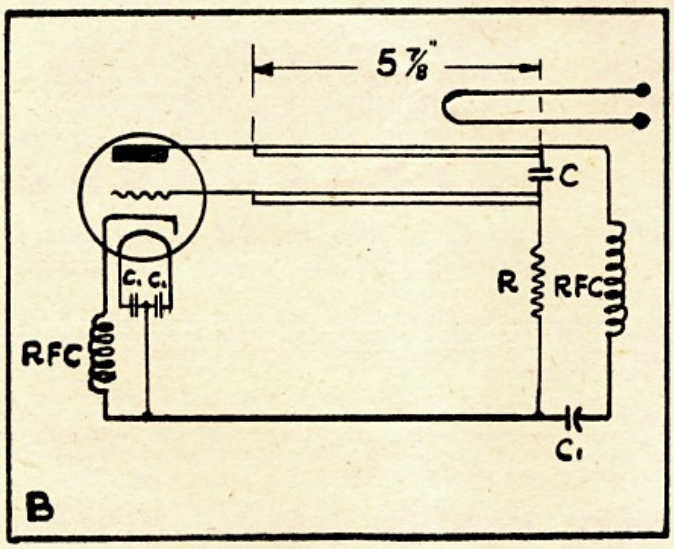
Now Cv can be shown to be equal to—

$$Cpg + \frac{Cpf \times Cgf}{Cpf + Cgf}$$

where Cpg, Cpf and Cgf are the respective interelectrode capacities of the valve. Thus for a start in selecting a suitable type of valve, one is chosen in which Cv is as small as possible. The table gives some interesting comparisons for different types of valves.

Valve	Cfg	Cgp	Cpf	Cv
955	1.0	1.4	0.6	1.77
HY615	1.4	1.6	1.2	2.25
2C22/7193	2.2	3.6	0.7	4.13
56	3.2	3.2	2.2	4.50
6J6	2.2	1.6	0.4	1.94
800	2.75	2.5	2.75	3.88
35TG	1.9	1.9	0.2	2.08
10	4.0	7.0	3.0	8.7
2A3	7.5	16.5	5.5	19.7
834	2.2	2.6	0.6	3.07

It is seen that the 56 is not much worse than some of the accepted special valves used for this high frequency range, AS FAR AS THIS CIRCUIT IS CONCERNED. As the 56, or its 6 volt equivalent, is readily available, this valve was chosen for a start. Of the other factors in the equations for C and L, Cl and Ll are to be found in most advanced text books, and Lv is somewhat indeterminate. For the purposes of this article, the values for Cl and Ll can be written



$$Cl = 0.706\ l\ /\ \ln \frac{2D}{d}\ \text{mmfd.}$$

$$Ll = 0.01016\ l \left\{ \ln \frac{2D}{d} - \frac{d}{l} \right\}\ \text{microhenries}$$

where the conductors used for the line of length "l" inches are "d" inches in diameter, and distant "D" inches between their centres. The logarithms involved are those to the base "e." For the experiment under review, the copper rods used were 1/4-inch diameter, and separated 1/2-inch between centres. Thus, for a line of length "l" inches—

$$C = 4.50 + 0.706\ l\ /\ \ln 4\ \text{mmfd.}$$

$$L = 0.01016\ l \left\{ \ln 4 - \frac{1}{4l} \right\} + Lv\ \text{microhenries}$$

For C mmfd., and L microhenries, $f\ \text{Mcs.} = \frac{159}{\sqrt[3]{L\,C}}$

There is no easy way of estimating Lv. It is best obtained by choosing a certain length of line and calculating the frequency. The oscillator is then constructed and its frequency of oscillation measured. This will be lower than the estimated value. Using this measured value of frequency, it is possible to find L. Knowing Ll, then Lv is determined. As an approximation, Lv might be expected as about 25% of L.

An oscillator was constructed in this way using rods 5 7/8-inch long. It was found that its generated frequency, as measured using Lecher wires, was 176 Mcs. Its estimated frequency was 200 Mcs., and from this Lv is valuated at 0.030 microhenries. This was the equivalent inductance due to the valve leads. The rods 5 7/8-inch long were butted and soldered on the ends of the grid and plate pins of the 56, thus the 0.030 microhenries includes the inductance of the pins themselves. Since the generated frequency was 176 Mcs., the effect of longer rods was not tried, but to bring the frequency into the band would require lengthening slightly the rods, or increasing the spacing between the rods. Increasing the spacing lowers the frequency as it increases the inductance more than it reduces the capacity of the circuit as a whole. No valve socket was used for the 56.

The calculations above show that it is quite possible to use a standard 56 to generate frequencies in the range 166-170 Mcs. How did the circuit work in practice?

(a) As an oscillator, the circuit used is shown below.

(Continued on Page 30)

WIRELESS INSTITUTE OF AUSTRALIA

INTERNATIONAL DX CONTEST

MANAGED AND CONTROLLED BY THE W.I.A.

VK INTERNATIONAL DX CONTEST, 1946

At the direction of the 1946 Federal Convention of the W.I.A. the Federal Executive has arranged an International DX Contest to be staged over two week-ends of November.

This contest is similar in nature to those previously arranged and which are very familiar to the pre-war gang with the exception that allowance has been made this year for single band operation in addition to the "open" all band trials. By this we mean that, if a Ham chooses, he may participate only on one or any number of individual bands or in the whole range as a participant in the open event. It was felt that the time lag in getting started after the re-instatement of the licences would not permit all stations to build multi-channel transmitters and receivers in ample time to contest the open stakes. Then again we think that previous contests have not encouraged entries from Hams with limited equipment facilities and our objective is to create fun for all.

To provide for single or individual band operators in both the receiving and transmitting sections there is to be a contest for each amateur band and all that is necessary for paricipation therein is a notation of the band concerned at the top of the log.

Attractive prizes have been generously donated by our advertisers for the winners of the "open" transmitting and receiving contests as well as for the top scorers in the single band entrants in Australia. In addition F.H.Q. is working on the design of a super certificate for all section winners in VK and the top scorers in each State of the Countries of the world.

Single band operation entries will be accepted from DX stations of course.

We sincerely regret that the ZL boys will not be joining us again this year in this international contest but, owing to the time factor at our disposal in organising this test this year and the fact that both countries have not received equal band assignments back again, as yet, we feel that there are too many difficulties in creating an equal contest for all at the moment.

It hardly seems necessary to have to explain the formulation of serial numbers, but, without this knowledge, some few Hams might miss the enjoyment of the contest, so here is a brief resume of the method. Each participating station allots himself three figures, anything between 111 and 999. These figures form half the six-figure serial number that he hands over to the station he contacts. The other half, at the first QSO, consists of three noughts, 000. Therefore, for example, 453,000 may be a station's number that he passes on to his first con-

tact. In exchange, he will receive a similar number, say, 687,989, which shows that that station has worked another station before, because the three 0's have been substituted by 989. The second half of the six-figure serial number is taken from the **first** three figures of the number received at the previous QSO, and is added on to a station's own three figures. Then this combination is given to the next contact, and so on throughout the test. Always retaining the first three figures, adding the second and transmitting them in that order.

The executive of the W.I.A. invite amateurs all over the world to participate in this contest and can guarantee you some thrills—especially as the U.H.F's. should be opening-up around this time of the year!

RULES AND CONDITIONS

1—There shall be two contests:—
(a) Transmitting.
(b) Receiving.

2—Contestants may participate in the "open" events, that is, on all licenced amateur bands, or, in any one or more individual bands by submitting a log for each band. There shall be awards for the "open" section as well as for the winners of each band.

3—The Wireless Institute of Australia Contest Committee shall be the sole adjudicators, and their rulings will be binding in the case of dispute.

4—The nature of the contest requires the world to contact all States of VK.

5—The contest is to be held from 1700 GMT, Saturday, 2nd November, till 1700 GMT Sunday, 3rd November, 1946, and will be continued over the following week-end, 9th and 10th November.

6—The contest is open to all licenced transmitting amateurs and receiving stations in any part of the world. Unlicenced ship and expedition stations are not permitted to enter the contest. Financial members of the W.I.A. and its affiliated societies only will be eligible for awards in VK.

7—Only one licenced operator is permitted to operate any one station under the owner's call-sign. Should two or more operator's operate any particular station, each will be considered a competitor, and must enter his own call-sign and submit, in his log, the contacts established by him. This debars persons from entering who have not a Ham licence.

8—Each entry must be signed by each competitor as a declaration of the above statement.

9—Each participant will assign himself a serial number of three figures, as detailed in the contest description. When two or more operators work the one station, each will assign himself a separate number.

10—All amateur frequency bands may be used.

11—Only one contact with a specific station on each of the bands during each week-end will be permitted.

12—Contacts may be repeated on each of the succeeding week-ends with the same stations in accordance with Rule 11.

13—Each contact must be accompanied with an exchange of serial numbers and signal strength reports, including readability, strength and tone.

14—**Highly Important.**—The judges reserve the right to disqualify any station whose tone report is consistently given less than T8.

15—Scoring.—Three points will be allowed for every contact completed with an exchange of serial numbers and signal reports.

16—Australian stations will multiply their total score by the number of continents worked on each band and the stations outside VK by the number of Districts worked on each band in Australia; there being eight in all, VK2, 3, 4, 5, 6, 7, 8, 9.

17—No prior entry need be made for this contest, but each contestant is to submit a log at the conclusion of the test showing: date, time (in G.M.T.), band, station worked, in and out serial numbers, in and out signal reports, and points claimed for each QSO.

18—Entries from VK stations must reach the W.I.A., 191 Queen Street, Melbourne, C.1, not later than 1st January, 1947, and the foreign logs no later than 31st January, 1947.

19—Awards.—Attractive certificates will be awarded to the station returning the highest total in each State of each participating Country. Special prizes, donated by our advertisers, will be awarded to section winners in Australia. There will be no world winner.

20—Foreign stations should call CQ VK and the VK stations, CQ DX TEST.

RECEIVING

1—The rules for the receiving contest are the same as for the transmitting contest, but is open to members of any Short-wave Listeners' Society in the world. No transmitting station is allowed to compete in the receiving contest too.

2—Only one operator is permitted to operate only one receiver.

3—The dates, scoring of points, and logging of stations once on each band per week-end are subject to the same rules as for the transmitting contest.

4—To count for points, the call-sign of the station being called, and the strength and tone of the calling station, together with the serial number and signal strength report sent by the calling station, must be entered on the log.

5—The above items must be filled in before points can be claimed, that is, it is not sufficient to log a station calling CQ or TEST. Verification of reception must be made in accordance with the conditions in Rule 3 above.

6—VK receiving stations cannot log any VK stations—only foreign stations. Foreigns stations will enter up VK stations heard only.

7—The awards for the receiving contest will be similar for the winners in the transmitting test.

8—Receiving logs are to be similar to transmitting logs.

DX CONTEST

A.R.R.L. and R.S.G.B. confirm dates as OK.

The world is receiving full particulars and publicity by air mail—co-operation assured.

See article on contest for rules and details.

All licenced bands may be used.

There's a contest for all—transmitting and receiving.

Prizes for the "open" event as well as for individual band operation available to members.

The following advertisers in "Amateur Radio" have generously donated valuable trophies:—

Rola Co. Pty. Ltd.—One G12 speaker.

Philips Electrical Industries.—One Philoscope L.C.R. bridge. Two TB1/100E (HF100) Transmitting Valves. Two TB1/50E (800) Transmitting Valves.

Standard Telephones and Cables.—Two 4242A medium frequency triode transmitting valves. Two 4282B high frequency transmitting valves. Two VT90 V.H.F. transmitting triodes.

Trimax Transformers Pty. Ltd.—One type TA907 Universal Modulation Transformer.

Keith Harris and Co. Pty. Ltd.—Eddystone components to value of £5.

Amalgamated Wireless Valve Co. Pty. Ltd.:—Transmitting Valves to be selected.

Technical Book and Magazine Co.—Three subscriptions to either QST or CQ.

Swales and Swann.—Transformers and chokes, etc., to value of £5.

Radio Equipment Pty. Ltd.—One "University" A.C./D.C. Multimeter.

Further contributions will be announced in the "stop press" section of the October issue of "Amateur Radio."

SIMPLIFIED DESIGN OF TANK CIRCUITS FOR R.F. AMPLIFIERS

By W. T. S. MITCHELL, VK3UM

PART 1—DESIGN OF L/C RATIOS

This is the first of two articles dealing with the simplified design of R.F. tank circuits. This article was originally written in 1939, but due to further information being co-related, it has been left till now. However, as so many newcomers are "opening up," and this article is initially for the beginner, now is a good time to present it. It will further serve as a check for the oldtimer.

A—General

The general theory of the basis for the calculations can be found elsewhere, but just a brief outline showing the derivation of the tables will be given. When the newcomer is starting up he is generally inclined to rush things and slap a rig together, but by the use of the following tables, he can be sure that his R.F. tank circuits are working efficiently. The writer has drawn a series of ABACS for the following tables, but it is thought that the tables do the job, the only mathematics required being a knowledge of square roots, multiplication and division.

B—Power Amplifiers

Let us make a start by taking the most commonly used Class C Amplifiers.

There are three generally used circuits in use, namely:

(a) The single ended unbalanced P.A.
(b) The single ended balanced P.A.
(c) The push-pull balanced P.A.

Now since we know the operating voltage and current for the particular tube or tubes in use (from Manufacturers' Data), we can determine the input power. The average efficiency of a Class C Amplifier at frequencies down to 30 Mc. can be taken as 70%.

Thence $Po = .7\ Ep\ Ip$
where Po = output in watts
Ep = DC voltage
Ip = DC current

Now Reinartz has shown ("How Much C," QST, March, 1937) that the loaded tank impedance is related to the power output, as shown:—

$$Z = \frac{E^2}{Po} \text{ (Fig. 1)} \qquad Z = \frac{2E^2}{Po} \text{ (Fig. 2)} \qquad Z = \frac{4E^2}{Po} \text{ (Fig. 3)}$$

where Z = loaded tank impedance in ohms
E = R.M.S. voltage
and Po = power output
also $E = n \times Ep \times$ efficiency
where n = a factor depending on angle of flow of plate current (for an angle of 135 deg., a good compromise, n becomes .8).
therefore $E = .8 \times .7\ Ep = .56\ Ep$

$$\text{thence } Z = \frac{(.56\ Ep)^2}{.7\ Ep\ Ip} = \frac{.448\ Ep}{Ip} \text{ (Fig. 1)} \quad \ldots (1)$$

$$Z = \frac{2(.56\ Ep)^2}{.7\ Ep\ Ip} = \frac{.896\ Ep}{Ip} \text{ (Fig. 2)} \quad \ldots (2)$$

$$Z = \frac{4(.56\ Ep)^2}{.7\ Ep\ Ip} = \frac{1.792\ Ep}{Ip} \text{ (Fig. 3)} \quad \ldots (3)$$

since $Z = Q\ Xc$

$$= \frac{Q}{2\ pi\ f\ C}$$

$$\text{therefore } C = \frac{Q \times 10^3}{2\ pi\ f\ Z} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

where C = capacity in mmfds.
f = frequency in Mcs.
Z = impedance in ohms
Q = circuit magnification factor

It has been shown that the operating Q of a circuit is the ratio of circulating power in the circuit to the power delivered from the circuit. This ratio or Q determines the harmonic content of the output. For amateur transmitters, a Q of 12 for amplifiers is considered desirable, striking a happy medium between maximum impedance transfer and "flywheel effect," (which reduces the harmonic output). In other words, we require high L/C for maximum transfer, and high C/L for that "flywheel effect."

So now, substituting (1) for Z in (4), we get:—

$$C = \frac{12 \times 10^3 \times Ip}{.448 \times 2\ pi\ f\ Ep} = \frac{4263\ Ip}{f\ Ep} \text{ (Fig. 1)} \quad \ldots\ldots (5)$$

where C = capacity in micromicrofarads
Ip = DC plate current in milliamps
Ep = DC plate voltage in volts
f = frequency in megacycles

$$\text{similarly } C = \frac{2131.5\ Ip}{f\ Ep} \text{ (Fig. 2)} \quad \ldots\ldots\ldots\ldots\ldots (6)$$

$$\text{and } C = \frac{1065.7\ Ip}{f\ Ep} \text{ (Fig. 3)} \quad \ldots\ldots\ldots\ldots\ldots (7)$$

Now all that remains to be done is to substitute the particular frequency we are to use in either (5), (6), or (7). This is shown in the Table, the frequency taken, being the centre frequency for each amateur band.

It is important to know now that the capacity obtained is the ACTUAL capacity required to tune the given inductance to resonance. We must realise that we have the output capacity of the tube or tubes also in parallel across our coil. This will not worry us unduly providing our coil is designed to give us the inductance calculated from the Table.

Another important point to note, is that if the capacity obtained for Fig. 1 be say 80 mmfds., the capacity required for Fig. 3, for same conditions and output, will be ¼ of Fig. 1, or 40 mmfds. per section of the split stator. For Fig. 2, the total capacity required would be 40 mmfds., or 80 mmfds. per section of split stator. (A single stator used in this circuit would have capacity of 40 mmfds.)

Now let us get down to business again and find what our factors will be for L.

$$L = \frac{25330.3}{f^2\ C}$$

Now substituting our value for C from (5) inductance becomes:—

$$L = \frac{25330.3 \times f\ Ep}{f^2 \times 4263\ Ip} = \frac{5.942\ Ep}{f\ Ip} \text{ (Fig. 1)} \quad \ldots\ldots\ldots\ldots (8)$$

where L = inductance in microhenrys
f = frequency in megacycles
Ep = DC plate voltage in volts
Ip = DC plate current in milliamps

$$\text{similarly } L = \frac{11.884\ Ep}{f\ Ip} \text{ (Fig. 2)} \quad \ldots\ldots\ldots\ldots\ldots (9)$$

$$\text{and } L = \frac{23.767\ Ep}{f\ Ip} \text{ (Fig. 3)} \quad \ldots\ldots\ldots\ldots\ldots (10)$$

L/C CONSTANTS "K" FOR AMATEUR FREQUENCIES

Freq. Mcs.	P.A. or H.G.*	Fig. 1 and 4		Fig. 2 and 5		Fig. 3	
		C	L	C	L	C	L
3.75	Amp.	1137	1.584	568	3.169	284	6.338
	Dblr.	548	3.286	274	6.572	—	—
7.15	Amp.	597	0.831	298	1.662	149	3.324
	Dblr.	288	1.723	144	3.447	—	—
14.2	Amp.	300	0.418	150	0.837	75	1.674
	Dblr.	145	0.868	72	1.735	—	—
28.5	Amp.	150	0.208	75	0.417	37	0.834
	Dblr.	72	0.432	36	0.865	—	—
52	Amp.	82	0.114	41	0.229	21	0.457
	Dblr.	40	0.237	20	0.474	—	—

* Power Amplifier or Harmonic Generator.

$$C = K\frac{Ip}{Ep} \qquad L = K1\frac{Ep}{Ip}$$

where C = capacity (mmfds.)
L = inductance (microhenrys)
Ip = DC plate current (milliamps.)
Ep = Dc plate voltage (volts)
K = constant for C (from table)
K1 = constant for L (from table)

Since C can be varied, we must have an accurate value of L, so that our L/C ratio will be the value we are calculating for. The second part of this article will provide a simple means of obtaining this calculated value of L.

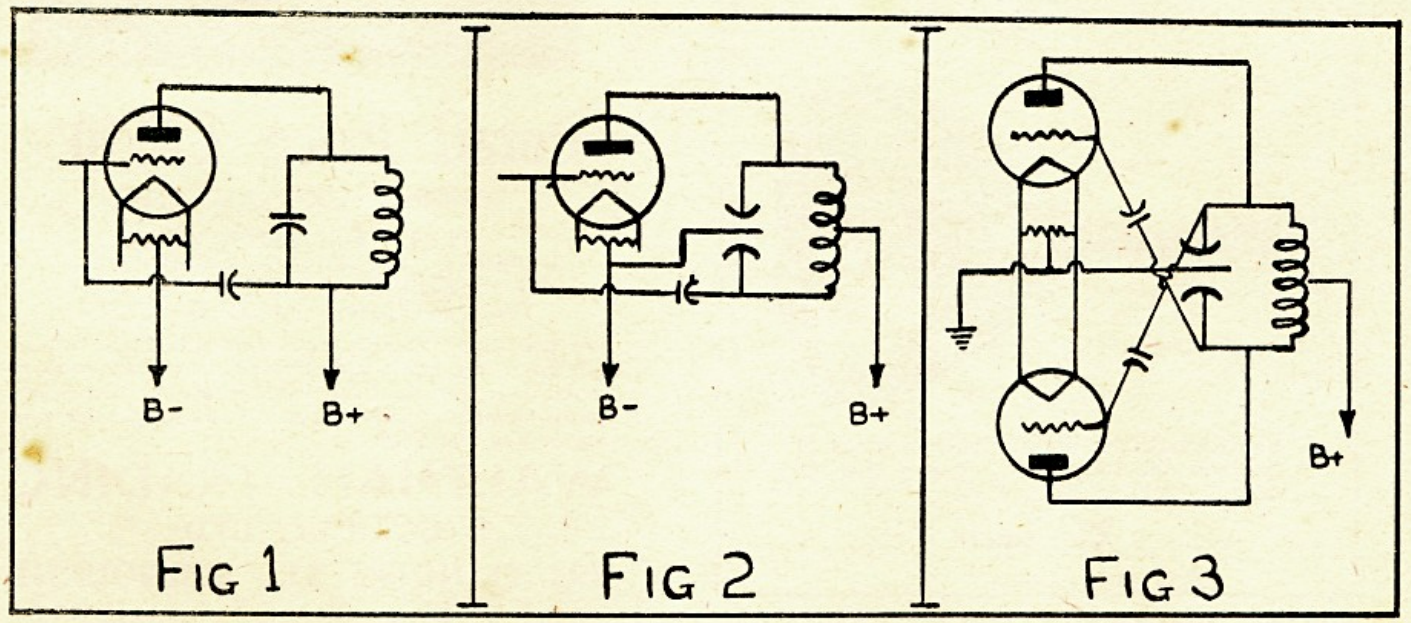


FIG 1 FIG 2 FIG 3

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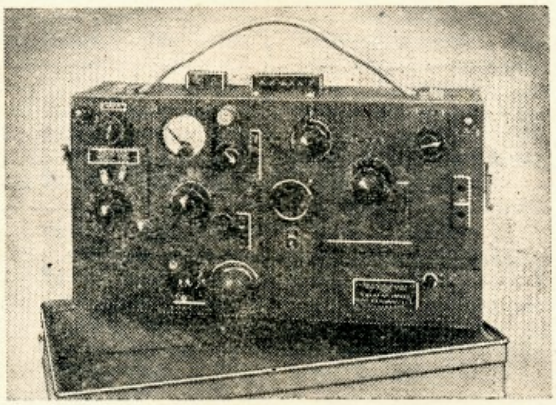

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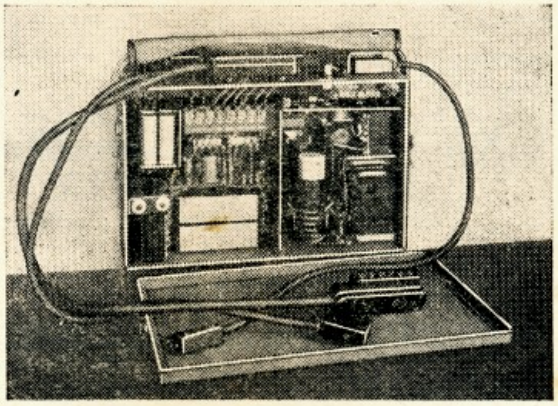

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PLUS 15/- EXTRA FOR SPARE GAS-FILLED VIBRATOR IF REQUIRED — PLUS 10/- FOR TWO WOODEN PACKING CASES

We can supply country customers with Pack only at £6/6/-. We can supply city customers who wish to make their own AC Pack for this receiver, the transceiver complete with valves, thermo-ampmeter and Morse Key, for £6/6/-.

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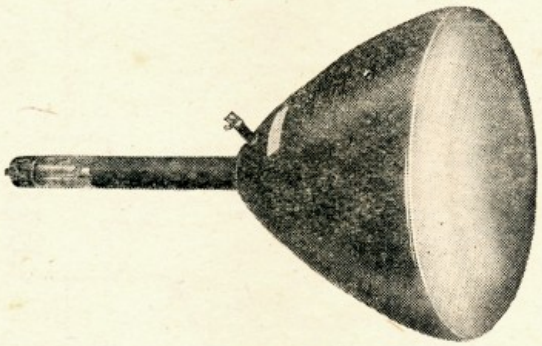

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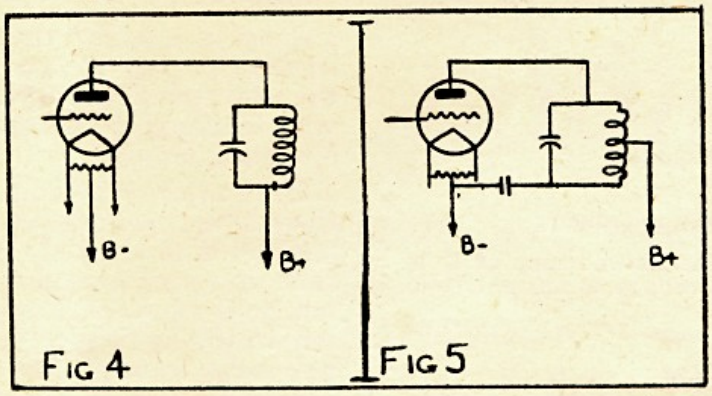

FIG 4 FIG 5

C—Frequency Multipliers

Circuits for frequency multipliers, i.e. doublers, triplers, quadruplers, etc., are similar to Figs. 1 and 2, but need not be neutralised if used for this purpose only.

The same formulae that apply to P.A. apply to frequency multipliers, with the exception that the tube efficiency is reduced to approximately 50% (average, for modern tubes).

Also our value for "n" now becomes .787 corresponding to an angle of flow of 120 degrees. This value of "n" gives slightly greater output, but with a slight increase in driving power. By using the modern beam tetrodes for doublers, we can generally obtain ample driving power to run them.

Referring to (1) and substituting these new values we obtain:—

$$Z = \frac{(.787 \times .5\ Ep)^2}{.5\ Ep\ Ip} = \frac{.31\ Ep}{Ip} \text{ (Fig. 4)} \quad .. \quad (11)$$

$$\text{and } Z = \frac{.62\ Ep}{Ip} \text{ (Fig. 5)} \quad .... \quad (12)$$

Now, as it has already been pointed out, by assuming a small value of Q our "flywheel effect" is decreased, thus increasing the tendency to generate harmonics, which is what we require. A value of Q of 4 will give us this result, so our equation (4) now becomes:—

$$C = \frac{4 \times 10^3 \times Ip}{.31 \times 2\ pi\ f\ Ep} = \frac{2055\ Ip}{f\ Ep} \text{ (Fig. 4)} \quad .. \quad (13)$$

$$C = \frac{1028\ Ip}{f\ Ep} \text{ (Fig. 5)} \quad .... \quad (14)$$

Substituting these values in:—

$$L = \frac{25330.3}{f^2\ C}$$

We get:—

$$L = \frac{12.322\ Ep}{f\ Ip} \text{ (Fig. 4)} \quad .... \quad (15)$$

$$\text{and } L = \frac{24.644\ Ep}{f\ Ip} \text{ (Fig. 5)} \quad .... \quad (16)$$

These values for variations of "f" are also tabulated. To show how simple is the operation of the table let us take two examples.

1.—Find L and C for P.P. 809's operating at 750 volts and current 150 mills (total) on 20 metres.

$$C = K \frac{Ip}{Ep} \qquad L = K1 \frac{Ep}{Ip}$$

$$\frac{Ep}{Ip} = \frac{750}{150} = 5 \qquad \frac{Ip}{Ep} = \frac{150}{750} = .2 \qquad K=75 \qquad K1=1.674$$

therefore $C = .2 \times 75 = 15$ mmfds. (approx. 30 mmfds. per section)

$$L = 5 \times 1.674 = 8.37 \text{ microhenrys}$$

(Note.—This value of C of 15 mmfds. is TOTAL capacity across L.)

2.—Find L and C for single ended unbalanced 807

operating as a tripler on 10 Metres with 500 volts on the plate at 25 mills.

$$\frac{Ep}{Ip} = \frac{500}{25} = 20 \qquad \frac{Ip}{Ep} = \frac{1}{20}$$

$$\text{therefore } C = \frac{1}{20} \times 72 = 3.6 \text{ mmfds.}$$

$$\text{and } L = 20 \times .432 = 8.64 \text{ micrihenrys}$$

(Note.—It can be seen that the above value of C is almost unobtainable, unless the voltage to current ratio is reduced.)

If Ep is reduced to 250 volts, then—

$$\frac{Ep}{Ip} = 10 \qquad \frac{Ip}{Ep} = \frac{1}{10}$$

$$C = \frac{72}{10} = 7.2 \text{ mmfds.}$$

$$L = 10 \times .432 = 4.32 \text{ microhenrys}$$

Of course, reducing our voltage will lower our output but if we have an amplifier stage following, this may not be a great disadvantage. However, the Table has its merit in the fact that it is intended primarily for frequencies down to 14 Megs. and is accurate over this range. Below 14 Megacycles however, values of C obtained cannot usually be realised with a variable condenser, so actually we must sacrifice our L/C ratios to some extent here. It can also readily be seen that it is not practically possible to use the same condenser in the final, over all ranges.

The second part of this article will deal with the design of transmitting coils, from the value of inductance obtained by the above Table.

EDITORIAL.

a sheep as a lamb," their methods, procedure and conduct on the air are characterised by none of the restraining influences felt by the average Ham who is proud of his hobby, his station and his operating ability.

The subject is now under review by the Federal Council and your Institute is going to take vigorous action to clean up the position. In the meantime any person reading this statement who does not hold an A.O.C.P. or station licence and who ion which he is using or contemplates using for has radio transmitting equipment in his possesscommunication purposes on the Amateur Bands is advised to get in touch with the Secretary of the W.I.A. Divisional Headquarters of the State in which he resides. He will then receive all possible assistance towards obtaining his ticket if he desires to become a Ham, or of disposing of his equipment at a reasonable price if he does not. Otherwise if he is of that irresponsible type who considers he cannot be caught and carries on "pirating" he will find his "Indian Summer" remarkably short and retribution swift and by no means painless.

Every licenced amateur can assist in locating these pirates and advising his Divisional Council of the details for subsequent action. Your personal interests are directly at stake.

DX FOR THE MONTH

28-29 MEGACYCLES

The ten meter band is again coming into its own and can you wonder after the terrific QRM one gets from that factory on 20 Mx., in other words the boys are finding that a complete QSO on 10 Mx. is far more enjoyable than the struggle on 20.

Conditions in general are again settling down to what experience has taught us regarding the best times for the various Continents, and the following times should be of interest to newcomers on 10. 7 a.m. until 3 p.m. for contacts with the United States and islands in the Pacific with K6 often as late as 6 p.m. Central Americans from 10 a.m. till 1 p.m. South American LU around 8 a.m. and the northern parts, i.e. Colombia, etc., from around 8.30 a.m. until 11 a.m. South Africans from 3.30 p.m. until 6 p.m. with the Central and North Africans from 5 p.m. till 6.30 p.m. The Europeans from 5.30 to 7 p.m. with an occasional station as late as 11 p.m.

The position regarding the DX with anything but a beam type antenna need not be stressed, for so often they just are not there if one changes to a good long wire antenna—so get along with that three element rotary if you want to enjoy the pleasures of ten.

Noel of VK5NR (ex-VK3NR) informs us of some of his work and it's a pity that Katherine is in the Northern Territory; evidently it's an ideal location (for radio only) and the following were worked in one night with 25 watts input to the final 807—G3FJ, GI5TK, I2KN, G5RF, OK1FF, F8ME, YR5C, HB9BZ, YI2CA, SU1KE, VP9AP, AC4YN. Noel also helped SU1KE to make WAC in 1½ hours on 1st August, i.e. VU2WP, VQ4MM, VK5NR, G5DF, PY2QK, and a W2.

United States.—W0ULM was the earliest QSO at 0645, W5EHM is interested in making 6 Mx. skeds with VK; W8CRA, of DX fame, is now W3CRA. W5CXS has added a director above and below the director of his three element rotary making it a five element job with greatly improved low angle radiation. W6HIM is using only 17 watts input to an 807 final and a new four element rotary will outshine any of those so-called Californian KWers.

South America.—VP3LF has never heard a VK and TG9PB is trying to convince him to put up a three element rotary. VP3LF is up to R9 every Sunday morning.

W8AIE/ss Cape Dacato on 28050 CW with 20 watt input made a good contact when off the coast of Colombia, S.A., Central America and the West Indies. TG9RC, 28110 and 28180 fone, is workable from 0800 to 1400 hours. TG9RC fone is good and is using a vertical ¾ wave extended Zepp type antenna.

Asia.—XZ2DA 28100 fone with 40 watts to an 807 and a two element rotary. VP9AP at Aden, Arabia, on 28300 fone worked VK3JD and VK3YP, has a crystal detector and four stages of audio—considering the number of unsuccessful callers!!!!!

AC4YN on 28290 CW in Tibet is a hard one to contact.

Africa.—Every Sunday afternoon the band is full and

the following are probably the best. ZS6ID CW, ZS6BT CW, ZS6EJ fone, CR7AD CW on 28075, ZE1JJ CW, ZS6HS CW, ZS5LK, ZS2X, ZS5BZ, ZS5BS. SU1MW from 1800 E.S.T.

Europe.—F8ZR 28300 CW, G5PP 28120 fone and at good strength, G2AIW 28075 CW.

We have just heard that VK3BW has landed a 40 ft. steel windmill tower also that VK3JK, at Wangaratta, has a windmill tower on the way up although Jim is doing very well with his three half waves co-ax fed flat top which he is using at present.

"FIFTY AND UP"

"Fifty" and Up certainly covers a lot of ground, however, the main activity, at least in VK3, which these notes mostly cover, concerns the 50-54 megacycle band. Once again the main contributor has been Ken McTaggart (VK3NW) and covers operations from his station. There are many more, both in VK3 and other States, who could make these notes very interesting reading. Nevertheless the request in last month's magazine did little to bring forth notes from other places.

New signals heard are 3ZO in Balwyn, who is using his 10 Mx. outfit and doubling in the final, which I believe is a TZ40, his receiver being a conventional 10 Mx. super with plug in coils wound for 50 Mc. and his antenna a half wave 40 Mx. 3GB, who has a receiver consisting of 954 R.F., 954 Mixer and 955 Osc. feeding into a conventional super and whose transmitter at the moment is his exciter unit using an 807 doubler into a co-ax. fed dipole. 3BW, in Portarlington, was heard testing his new outfit on Sunday, 11th August, and by the time these notes appear he should be a regular worker on the band. His sig was Q5 R6/7 at the writer's station. He is waiting for his converter to be finished—a job being done by a well-known Melbourne firm, and incorporating an RL7. He will be using a beam antenna.

The strong winds caused a mishap at Dave's place (3MJ). He woke up one morning to find his four element rotary a tangled mass on the roof top. However he has a brand new one functioning again which appears just as good as the other. No other damage reported although I was sure my beams would go too during some of the strong gusts.

The most consistent signals heard on 50-54 Mc. are still 3MJ, 3QO, 3YJ, 3AFQ, 3GG, 3HK and 3NW. VK3IZ at Red Hill (43 miles from Melbourne), is becoming very interested and some time ago reported hearing signals from 3MJ and myself, using a 56 super-regen. and two stages of audio. 3MJ worked him "cross band" using 40 Mx. and 50 Mc. On Friday, 9th August, I packed the portable outfit into the "Hornet" and went down to Jack's place (3IZ) for the evening. His shack is several hundred feet high on the Mornington Peninsula but is about 100 feet down the far side of a ridge from Melbourne and is well screened by a thick belt of large gum trees also. Although our dipole was only four feet above the flat galvanised iron roof and about 16 feet from the ground, no trouble was experienced in contacting 3MJ with signals at Q5 R5 both ends. We regarded this effort as quite a triumph for the 50 Mc. band and it certainly shows that the signals reach out quite a long way. Signals also heard on the portable receiver were 3GG, Q3 R4; 3QO, Q1/2 R2/3, and the tone signal from my own home transmitter, which unfortunately was only being modulated about 50 to 60% and so did not cause much noise in the super regen, although one could hear that the carrier was knocking back the hiss. We are now hoping that 3IZ will be on shortly as he will provide a good "DX" contact for us. He plans to use either a fixed beam of the three element type directed on Melbourne or possibly a V beam. The transmitter will have a T55 in the final using E.C.O. and doubling stages. A very pleasant evening was had with Jack, Rex (2nd op.) and Gwen who is Rex's XYL and QSL manager for the station!!

On the way home I stopped at Frankston (23 miles) and contacted 3MJ again. This time the signals from the portable were Q5 R7 at 3MJ while his were Q5 R9 on the super regen. This great increase in the signal strength from the portable over that obtained during the Belgrave trip (Q5 R5, also 23 miles) was probably due to the fact that I have "hotted up" the DET3-807 combination somewhat and increased the depth of modulation. Also my antenna by a most unfortunate error(!) was nearly 10% too long on the Belgrave test. When this was corrected a considerable increase in signal strength resulted. The power input is still only 3 watts however.

These results will show any Hams who live round Melbourne that good 6 Mx. work may be done at least up to 40-45 miles and those within this radius of the city need not feel that they will be wasting their time putting in a rig. Our next trip will be to Ballarat on 31st August. where we will test from VK3SE. After the results from Red Hill we feel confident that no trouble will be found in putting signals between here and the "Golden City." There are several chaps up there who are working on 50 Mc. and we see no reason why we should not contact them. However it will be necessary to have polarisation of antennas the same and probably fairly stable transmissions also.

Some considerable stir was caused during the month by a report that VK4CG and VK2ANN had both heard 50 Mc. signals from VK3. Many and varied were the accounts given by the various Hams who had got the information from "so and so" who got it from "such and such," and no two versions agreed. We have written to 2ANN and 4CG but to date have received no replies. Until these come in it is idle to make any speculations at all and we must just be patient. It may possibly be

CONSTANT VOLTAGE FOR LABORATORY MEASUREMENTS

CHANGE OF VOLTAGE ONLY 0.55% FROM NO-LOAD TO FULL-LOAD

MANY testing processes require constant voltage to be applied to valves or other equipment during the time that the test is in progress. It is useless to have instruments correct within 1% or less if the voltage is going to vary while the current or other feature is being read.

This is particularly important in the testing of radio valves in which some of the characteristics are critically dependent upon the applied voltages. An example of this is the Characteristic Tester recently constructed in the Laboratory of Amalgamated Wireless Valve Co. Pty. Ltd. at Ashfield. This equipment is used for the checking of a percentage of all valves manufactured each day, to see that the accuracy of the factory testing is maintained, and to carry out other tests not normally applied to the whole production owing to their complexity.

The equipment uses an electronic voltage regulator on the plate, screen and grid supply voltages. The input is from the 240 volt A.C. mains, the output is variable in voltage from 0 to 300 volts with a maximum current of 200 mA. With the maximum output voltage, the percentage voltage drop is only 0.55% for a change of load from 0 to 200 mA.

The equipment uses Radiotron type 807 valves, four of which carry the current of 200 mA. between them. The 807 is probably the most satisfactory type of valve for this purpose owing to its high current capability (72 mA. per valve maximum) and its high amplification factor. This is only one of many applications in which Radiotron type 807 may be used with every satisfaction.

Radiotron

MADE IN AUSTRALIA

that it is merely a rumour but this type of signal reception is what we expect from now on as the band begins to open up. I might say that if anyone listens on the band and hears signals would they report immediately to 3MJ or myself giving full details of times, calls, etc., as well as details of their own receiver and antenna system.

At 3NW a new receiver is being built and will be in operation shortly. It will consist of an 954 R.F., 954 mixer, 955 osc., two stages of 1600 Kc. I.F. amp. using 6K7's, a 6H6 2nd det., 6J5 B.F.O., 6H6 noise limiter, 6J7 and 6V6 audio. It will be used for portable work also. I hope to be on 166 Mc. by the time these notes appear, using an acorn 955 osc. in a concentric grid line set up. The concentric line is already in operation with the 955 attached and is 7-inch diameter. This gives a Q of 10,000 which is somewhat better than crystal control. The 955 will drive an 832 which will be modulated by a 6A6 Class B with about 20 watts input. The receiver for the time being will be the present portable 50 Mc. with 955 super regen. 6J5 and 6V6. I would be glad to hear from those operating on the band with a view to arranging tests.

During the last week-end 3BW Portarlington made his "come back" on the band using his new Kingsley converter (experimental) with RL7 and ECH35G. His signals are R7/8 in Melbourne and he gave the writer R9+, 3GG (long wire antenna) R8 and 3MJ (four element beam) R9+. Arch will be most active on the band from now on and will be a very good contact for us here.

Also during the week-end Fred (3YS) of Box Hill, put a good signal on the band and worked 3QO, 3MJ and myself. He was adjusting his Rx. which consists of a 9003 R.F., ECH35 mixer, 6K7 I.F. on 1200 Kc., 6U7 2nd det., 6U7 triode B.F.O., and 6V6 audio. His antenna is a half wave vertical co-axial dipole but he intends putting up a horizontal beam shortly. His Tx. consists of a 6A6 xtal osc. (8.4 Mc. xtal) and tripler, 6L6 doubler and 807 final and the speech line up is a Dynamic mike, 6C6, 6J7G and pair of 6V6's.

3GB, Harry, was also operating on phone.

You might care to have a couple of descriptions of good(!) 50 Mc. rigs for the edification of possible participants in the work so here is an account of 3MJ's gear. Rx. is RL7 R.F., EF50 R.F., EF50 mixer, 6J5 osc., 6AC7 1st I.F., 6AC7 2nd I.F. (6 Mc.), 6B6 2nd det, 6C8G B.F.O. and R meter tube, 6H6 noise limiter, 6V6 output and VR150 voltage regulator. Tx. is EL3 tritet doubler (6.375 Mc. Xtal), Taylor T21 doubler, 807 doubler, 100TH final. Modulator is a pair of 6L6G's.

PARASITICS

It is regretted that several errors were made in the circuits accompanying the article by Mr. J. Brown, VK7JB, entitled "Kinks for 807 Users," which appeared on page 10 of "Amateur Radio" for August. Unfortunately these errors are such that satisfactory operation of the circuit would be impossible. The corrections are as follows:—Figure 2, the value of the condenser which connects from the phone plug to the junction of the two 0.002 condensers should be 0.1, and not 0.002 as shown. The junction of all three condensers should be earthed. Figure 3, the negative pole of the microphone battery, and the cold end of the 0.5 mfd. by-pass condenser should be returned to earth, and not to the common cathode return as shown. Figure 4, the choke in the plate feed to the tube in the receiver should obviously be connected to HT, and not to earth as shown. The 0.1 meg. resistor in the lead to the 807 cathode should be connected to the plate of the tube, and the condenser in series with it should be 0.01 and not 0.05 as shown in Figure 4.

Federal and Victorian QSL Bureau

R. E. Jones, VK3RJ, Manager

U.S.K.A. (Swiss) QSL Bureau is again functioning from its pre-war address.

Cards for VU2WP and SV1EC should be routed via R.S.G.B.

The Postmaster General's Department advises that the list of Australian Experimental Licencees, which was expected to be issued in July, will not appear until early in September. The list, which will be in printed form with quarterly amendments will be issued by the Wireless Branch of the Department at a fee of 2/- per annum.

Several State QSL Managers have requested that the call sign of the station for whom the card is intended should be shown on the reverse side of the card as well as on the face. This little act will save your QSL Manager a lot of precious time, fellows.

Some interesting cards are to hand from Rusty Smith W6ONK, confirming contacts he made with VK stations whilst he was located at Bikini Atoll in the Marshalls, using the 28 Mc. band. So far none of the cards have evidenced "radio activity." Rusty's home QRA is 52 Oakvale, Berkley, Calif, U.S.A. to which address cards should be sent.

Another interesting bunch of cards arrived from W0NVF, W3SB/KG6, W. J. Sulser presently located at Guam, Marianas Islands. Sulser retains pleasant memories of Melbourne (and probably other VK capital cities) which he visited in April, 1942, when he was aboard the U.S.S. Boise. His full QRA is W. J. Sulser, A.C.R.M., Com. Air Pac. Pool (F.F.A.) Navy No. 939, c/o F.P.O. San Francisco, Calif.

The following was copied at VK3RJ, 9th August, from W1AW, A.R.R.L. H.Q.:—

"F.C.C. recently announced a further revision of amateur frequencies above 25 Mc. for proposed international allocation. The amateur band 5250 to 5650 Mc. is divided into two sections and relocated—now consisting of 3300 to 3500 and 5650 to 5850 Mc. Amateur micro wave allocations have not yet been altered to accord with the above but this may be expected to occur in the near future. This change is brought to the attention of amateurs to assist in planning equipment contemplated for use on micro wave bands."

Russ Coleston, VK3XK, writing from Cape Wickham, King Island, bemoans the fact that he will be off the air most of August, whilst in the location quoted. He is overhauling the Radio Beacon and other lighthouse equipment and is having a tough time with the boisterous weather.

Another note comes from Eric Trebilcock, once a VK5 and VK8. He is presently situated in Wynyard, Tas., and until the housing situation there improves, he cannot bring over his transmitter and the rest of his domestic goods and chattels including his YF. He is Op at the local airfield and occasionally puts in a burst at VK7AB in Burnie. Eric has itchy footed it around VK since 1940. Up to 1942 he was in VK9, thence VK4 until 1944, VK5 until 1946, and now VK7 until ???. Prior to 1940 he spent two years in VK8 and two years in VK2. I note that he has yet to sojourn in the premier State VK3.

Cards for the following VK3 stations are on hand and will be distributed at the monthly meeting on 3rd September, or on application to this Bureau:—

3AB, ABA, AC, ABW, ADR, ADX, AE, AFO, AGS, AKL, APM, ARH, ART, AV, BC, BG, BH, BR, CO, DA, DR, EF, EH, EJ, EM, EO, EQ, EZ, FA, GC, GM, GT, GX, HP, HV, IF, IG, IK, IP, IT, IU, JD, JR, JZ, KG, KU, KS, KT, LZ, MJ, MW, NB, ND, NF, NW, OP, PG, PZ, QD, QH, QI, QM, QN, QQ, QR, QW, RW, RZ, SD, SQ, ST, TD, TU, TZ, UC, UI, UJ, UO, UQ, VD, VE, VM, VQ, VV, WX, XA, XJ, XK, XN, YC, YG, YH, YP, YQ, YR, YU, ZJ, ZR, Woollard.

The QSL Manager would be grateful if any country members of the Victorian Division whose call is contained in the above list, would advise him of his address.

VK3 Hams please note that outward cards go to VK3OF, F. O'Dwyer, Thomas Street, Hampton, and inward cards to this Bureau, 23 Landale Street, Box Hill, E.11, Vic.

BOOK REVIEW

RADIO HANDBOOK

The long-awaited Tenth Edition of Radio Handbook is at last available, having been held up in production and due to shipping difficulties for some months.

First reaction on looking through this new edition was one of disappointment that it differed in no great degree from the previous edition. That this impression was false was apparent upon more detailed examination. Since almost half of the text is devoted to consideration of fundamentals, the presentation of which was so excellently done in the Ninth Edition, it is obvious that no drastic changes could be expected in this section. The chapters on Receiver and Transmitter construction, together with those covering other practical work have been revised and brought right up to date, indeed, in comparison with other similar books, this Handbook is, as in the previous edition, ahead of its time.

Particularly interesting is the stress laid upon Automatic Modulation Control in the chapters devoted to Phone Transmitters. As a phone hound the writer feels that this feature should be incorporated in every high frequency phone rig, a point of view with which the brasspounders will, for once, find agreement with me. The elimination of (negative) overmodulation which this system, when properly adjusted, can effect is of benefit to all users of the amateur bands, while the prospect of higher average modulation percentage (without increase of heterodyne QRM) should have much appeal to phone operators.

There are many other interesting items to be found in the RADIO Handbook, notable among these being a plate-cathode phase inventor with appreciable voltage gain. The treatment of co-axial tank circuits in V.H.F. receivers and transmitters is outstanding, and a chapter devoted to elimination of B.C.L. interference will be read with interest by all VK Hams in view of the stringent regulations imposed (at present) on us in this connection.

In 28 chapters the RADIO Handbook covers the whole field of Amateur Radio, and includes very comprehensive tables of Receiving and Transmitting Tube Characteristics, these by the way, are set out very clearly and in easy readable form, also much space is given to Workshop Practice and Tests Measuring Equipment.

As previously stated, the treatment of fundamentals is very thoroughly done, a matter of great importance in any such Handbook, whether it is to be used by the student, the established Ham or the old-timer. In all the science of radio, as in any other field of endeavour, there can be nothing so important as a clear understanding of fundamentals, a fact which, sad to relate, does not seem to be as widely accepted as it should.

The RADIO Handbook (Tenth Edition) is a must.

RADIO HANDBOOK.—Tenth Edition (Editors and Engineers, Los Angeles, Cal., 1946) compiled by W. W. Smith, Ray Dawley and others, 9½ by 6½ inches, 590 pages and index, 90 pages catalogue section, numerous illustrations, cloth bound, 17/-.

Our copy by courtesy of Technical Book and Magazine Co.

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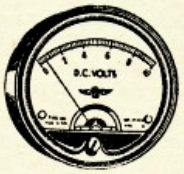

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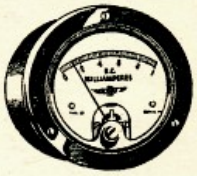

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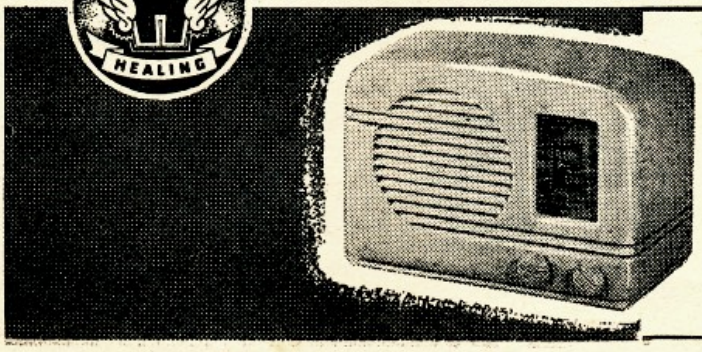

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DIVISIONAL NOTES

NEW SOUTH WALES

Secretary: Peter H. Adams, VK2JX, Box 1734 G.P.O. Sydney.

Meeting Place: Science House, Gloucester and Essex Streets.

Meeting Night: Fourth Friday of each month.

The July General Meeting was well attended, about 80 members and visitors being present. It was expected that there would be a large amount of general business and for this reason it was decided to leave the lecture until last.

Members were disappointed to hear that Wal Ryan, through ill health, had been forced to resign from the Council and from the office of President of the N.S.W. Division. Wal has devoted the past eleven years to the Institute and his sterling efforts kept the N.S.W. Division going during the war period.

Bill Moore, VK2HZ, has now been elected President and John Moyle, VK2JU, now becomes Vice-President in company with Harold Peterson. Bill Moore, who was Federal President for a term in the old days before the war, needs no introduction and is without doubt the best man that could be found to fill the vacancy. Bill is still living up at Springwood and this necessitates about four hours travelling per day but he has hopes of finding a house nearer Sydney very shortly.

There was considerable discussion on the Victorian Division's proposal for FHQ to endeavour to obtain a 200 meter allocation for amateur use and a motion was passed supporting this proposal.

A lively interest was shown by those present in the possibility of obtaining gear suitable for amateur use from the Disposals Commission. Harry Kinnear has been doing a good job as liaison between FHQ and the Commission and there is no doubt members will be in a position to buy some excellent gear in the near future. Full particulars, including prices, where possible, will be given in the Monthly Bulletin and country members shoud send in their orders as soon as possible. A good proportion of all gear on offer will be held in reserve for country members so that city members will not get an unfair advantage, but you must send in your order promptly, with cheque or money order, as stocks cannot be held for any length of time.

There was an animated discussion on the desirability, or otherwise, of a division of the 14 and 28 Mc. bands into phone and CW sections but in the end it was generally agreed that as the bands, as at present constituted, must be regarded as temporary only, there was no point in seeking to make any division until the full bands were available again.

At the conclusion of general business Mr. M. Lusby, B.Sc., B.E., VK2WN, delivered an illustrated lecture on "Electronics in Industry." Morrie is an engineer with the Westinghouse organisation and has had wide experience with industral electronic equipment. He covered an extremely wide range of electronic devices but unfortunately, as time was limited, some of these could only be touched on, and only those of special interest to amateurs were given detailed treatment. The lecture proved most interesting as most of the audience previously had only a sketchy idea of the operation of the many electronic devices described.

It has been decided to reintroduce the Zone System and Zone Officers are now being appointed. This will permit the Council to keep in much closer touch with country members. Zone Notes will appear in this section of "Amateur Radio" each month and country members are asked to keep their Zone Officer posted regarding their activities.

It is difficult to keep track of the doings of all active Sydney members and it would be appreciated if any members with anything interesting to report would drop a line to the Secretary. Any item of news value will be included in these notes.

Ray Priddle, VK2RA, is apparently the only member interested in working DX—at least he is the only one who sends in his list of new countries regularly each month. Perhaps the others are too busy on the air to have time to write in, but, unless more interest is shown, there is no point in keeping this section going. It's up to you, chaps.

2RA has now brought his total to 60 countries, some of the good ones being CT1JS, SM5OH, VS2BF, UO5VW and VS7AX.

One week-end recently 2VN found that he had a few surplus petrol tickets and so he and 2HZ decided to visit the boys in the Newcastle and Coalfields areas. They visited a number of ham shacks and from all accounts were accorded the hospitality that is traditional in these parts. It seems that a lot of DX is being worked from up there—mostly with relatively simple equipment. The local boys will have to look to their laurels when the DX Contest comes along.

In last month's notes it was stated that VK2JX was planning to put up an 8 element 28 Mc. rotary! In case anyone is wondering how such a contraption could be suspended between two 40 foot masts, it should be mentioned that the word was ARRAY not rotary.

VICTORIA

Secretary: R. A. C. Anderson, VK3WY, Box 2611 W, G.P.O., Melbourne. WM 1579.

Meeting Place: Lecture Hall, Chamber of Manufacturers' Building, 312 Flinders Street, City.

Meeting Night: First Tuesday of each month.

The Annual General Meeting of the Victorian Division, which was held in the Lecture Hall of the Chamber of Manufacturers, 312 Flinders Street, Melbourne, on the 6th August, 1946, was attended by 180 odd and proved to be a very successful and record one.

With President Harry Kinnear, VK3KN, in the chair the following visitors were warmly welcomed—VK7YL and husband (VK7JB), VK5RO, ZL4HS, VK2BN, "Nit Face" Hardie, Laurel Emil, the XYL of VK3AJE, also accompanied by her husband. The others present were VK's 3WQ, 3WY, 3KU, 3WG, 3DH, 3ET, 3LI, 3BD, 3WC, 3YS, 3ABA, 3LX, 3JX, 3QE, 3EK, 3GU, 3OP, 3TE, 3XJ, 3WO, 3VQ, 3XN, 3ZV, 3TF, 3QU, 3LA, 3AHM, 3MQ, 3AJK, 3YH, 3LM, 3ZT, 3VD, 3UO, 3WW, 3ADS, 3PA, 3TZ, 3IU, 3TJ, 3QA, 3EO, 3TQ, 3ARN, 3ZS, 3UR, 3VJ, 3ES, 3ZJ, 3IG, 3HK, 3UM, 3MN, 3UH, 3IK, 3RN, 3FJ, 3HB, 3PW, 3QP, 3KC, 3DM, 3CT, 3LS, 3JI, 3NM, 3ZB, 3SK, 3NW, 3MM, 3HC, 3IW, 3GS, 3ED, 3PC, 3AHJ, 3OF, 3OT, 3AJH, 3XM, 3RX, 3OC, 3OV, 3AJY, 3HS, 3JO, 3DF, 3AG, 3TU, 3AE, 3LN, 3ZC, 3QV, 3YJ, 3JD, 3ADR, 3FT, 3CF, 3JF, 3WF, 3EN, 3CR, 3VX, 3ALW, 3AFQ, 3YX, 3RJ, 3MX, 3EA, 3NY, 3HX, 3AP, 3SZ, 3YK, 3NU, 3SQ, 3OJ, 3QC, 3PG, and Messrs. Bander, West, Curnow,

VICTORIAN DIVISION A.O.C.P. CLASSES

The next series of A.O.C.P. Classes to be conducted by the Victorian Division of the Wireless Institute of Australia will commence in the first week of November. The Course comprises complete tuition in theory, morse code, and regulations up to the standard required to pass the examination for the A.O.C.P. Licence. The fee for the course is Five Guineas which includes text books. Intending students are advised to communicate with the Class Manager, Wireless Institute of Australia, Victorian Division, Box 2611W, G.P.O., Melbourne, as soon as possible.

Potter, Yeomans, Olsson, Iliffe, Porter, Sloss, Taylor, Fraser, Praidwood, Elliott, Gray, Sloane, Gauntlett, Neilson, Pollock, McLeod, W. E. Davies, Lancaster, Viney, Hampshire, Hatch, Smith, Groves, Chalmers, Henderson, Titheridge, Griggs, Matthews, Oakes, Clarke, Brooke, Barnes, J. A. Quinn, McLean, Gilbert, Strickland, F. Gee Wah, O'Brien, Lee, Maroney, Cox, Sandon, and Hogkinson.

The President's address regarding the progress of the Division during the first post-war year was very enlightening and is in condensed form hereunder:—

"The past year has been a most important one for this Institute. During that time we have seen the W.I.A. rehabilitated from its war-time existence to an organisation much bigger and stronger than it was in previous days. Membership is soaring (now over 400) and it is safe to say that over 90% of the Hams in Victoria are now members of the W.I.A. Victorian Division.

"Primarily you have to thank an enthusiastic band of 'old timers' for holding things together during the war years. Secondly, your Council for the past twelve months has been considerably encouraged by the enthusiasm you have all displayed by the record and sometimes embarassing attendances at meetings.

"This brings up the subject of new premises and as the building in which we hoped to obtain space is no longer available, any information in this connection will be greatly appreciated by the Council.

"During the past year you returned to your activities 'on the air,' you have not got all that to which we think we are entitled, but I can assure you from the knowledge I have of F.H.Q. efforts that 'it won't be long now.'

"The Convention at Easter was most successful and for that and the subsequent work done you are fortunate in having such excellent F.H.Q.

"As you know F.H.Q. is, since the Convention, a VK3 responsibility and it is a big one, nevertheless, it is a great honour for VK3 to have had this responsibility vested with us.

" 'Amateur Radio,' your Institute Magazine, is making wonderful progress, thanks to the solid effort expended by its staff.

"New equipment has been added to the Institute Library in the form of a Bendix Frequency Meter, also a Philoscope; details of which you may have read in the pages of 'Amateur Radio.' I submit that you acquaint yourselves with these and other equipment available for your use, by referring to the Technical Committee.

"A.O.C.P. Classes have started and we should soon have a flock of new Hams on the air and, I hope, some new members therefrom.

"Your Council has arranged with the Radio Trade for special buying privileges, the details of how it will operate should be in the hands of financial members in a short time.

"In concluding I would like to thank those who have given their help for various functions throughout the year—to thank and congratulate the Magazine Committee for their efforts—to thank the outgoing Council for the support and help in determining various problems and especially to thank your Secretary and your Treasurer for the sterling manner in which they handled a record busy period. And finally, I have personally had considerable pleasure in my position as President and also as Chairman of Council, but most of all I have appreciated the honour of being your President during our first post-war year."

In the absence of the printed copies of the balance sheets, from the auditors, a statement of the financial positions was given by the Treasurer.

Three nominations, namely, those of VK3KN, VK3XD, and VK3QS were received for the office of President and in honour of the past year's work as President, the assembly, by an overwhelming majority, returned VK3KN to the chair for another year.

Of the thirteen nominations for Council the successful candidates were Dick Dowling (VK3XD), Bill Gronow (VK3WG), Harry Kinnear (VK3KN), George Manning (VK3XJ), Dave Medley (VK3MJ), Ivor Morgan (VK3DH), Charlie Quinn (VK3WQ), and Herb. Stevens (VK3JO). With such an energetic President and new blood in the Council it is felt that they will be hard worked in implementing the wishes of the meetings.

One of the major items of interest during the evening was that relating to the report of the Disposals Committee and judging from the number of questions put to that Committee it clearly indicates that the Ham is a very keen buyer.

Murray Throp, ZL4HS, gave an interesting few minutes on the activities of the New Zealand amateurs also the range of frequencies on which the ZL's are permitted to operate. You should have heard the sighs when mental comparisons were made with those here in VK.

Dispenser of QSLs, Ray Jones is one of the most popular officials at the monthly meetings where he distributes up to 400 cards. His colleague, Frank O'Dwyer is also busy with the outward QSL cards.

On excellent authority it has been learned that the official list of licenced stations in the Commonwealth is now in the hands of the printer, who no doubt is very busy in view of the forthcoming elections, but it is anticipated that lists will be available for distribution towards the end of September, 1946, price 2/-.

WESTERN ZONE CONVENTION

The Western Zone will hold a Convention at

HAMILTON

During the Week-End—

OCTOBER 26 AND 27

It is proposed that Saturday evening will take the form of a Dinner and Smoke Night, and the main Convention Business will be held on the Sunday.

Those interested should contact:—

M. RILEY, VK3TN, Hamilton
G. WELLS, VK3TW, Hamilton
B. PLOWMAN, VK3QC, Terang

Further particulars will be published in the October issue of this Magazine.

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QUEENSLAND

Secretary: C. Marley, VK4CJ,
Box 638 J. G.P.O., Brisbane.

Meeting Place: State Service Building, Elizabeth St., City.

Meeting Night: First Friday of each month.

Those members present at the July General Meeting were entertained by the screening of some interesting films, two being "Frequency Modulation" and the "Battle of Britain." A further showing will be made at the coming meeting. This will of course be subject to sufficient time being left after the election of a new Secretary as Cedric Marley, 4CJ, has been forced to relinquish the job owing to a transfer to Rockhampton. The number of fellows who offer their services for this job is really amazing. Sherlock Holmes complete with Dr. Watson and magnifying glass couldn't find them.

It is hoped shortly for a visit to be made to the Radio Research Laboratory of the Queensland University. We recently had the pleasure of a lecture on Ionospheric Predictions by Mr. McNichol of that branch. Reverting again to 6 meter work, for the benefit of interested parties in other States, there are always 4 or 5 VK4's operating on the 50-54 Mc. band every Sunday night between 7 and 9 p.m. We are also on at sundry other times—4CG on Thursday nights plays around in the hope of making a contact—but Sunday night is a regular. The rigs are Xtal controlled and several supers are in use. At a very recent meeting of the Experimental Advisory Committee the representatives of the R.I's. Department emphasised that something would have to be done about certain out-of-band operation. If "something" is not done, well—I'd rather not frighten you. It must be remembered that a phone man on 14.1 Kc. for example, has a side-band of anything of 2 to 5 Kc. out of the band.

The news re the organising of a DX contest later in the year was received with some gratification by the DXers in Brisbane. What with the way ZL's pound through on 20 however, QRM will certainly be terrific.

Now for a few local oscillations.

4CJ—All the best Cedric, and many thanks for the job you've done. May Rockhampton be a less QRM'y location for you.

4AW—Busy with new houses, speedway P.A. jobs, and I nearly forgot—Ham Radio.

4RQ—Bob is a busy man as President of the Longreach Bowling Club, but hopes to be on 7 Mc. soon.

4XG—Doing his darndest to get on 6 Mx., but striking a few snags.

4HR—The local DX authority and the man behind an FB 6 Mx. signal.

4KS—Has a very snappy system for switching the rig on and the rx. off. Invaluable for checking the other fellows' channel before going over.

4KH—Has yet another receiver—this one looks like being the final however. How's DX Bill?

4EL—Finding the transformer shortage a bit of a problem. Still uses the famous "vertical."

4RF—Has one of the neatest rigs we've ever set eyes on. Doing a bit of "junk" service for the boys.

Well, for this month that's the lot, so until next month the best of oscillations and radiations, 73's de 4ZU.

SOUTH AUSTRALIA

Secretary: E. A. Barbier, VK5MD,
Box 1234 K, G.P.O., Adelaide.
Meeting Place: 17 Waymouth Street, Adelaide.
Meeting Night: Second Tuesday of each month.

The Monthly General Meeting was held on Tuesday, 13th August, at 17 Waymouth Street, and a splendid attendance was again noted. Visitors were VK5DQ, VK5JB, Mr. S. W. Wardle, Mr. A. J. Broadbent and three others who apparently desired to remain anonymous judging by their signatures. VK5FQ brought his Dad along and it was hard to see who was the more interested of the two. The lecturer for the night was Mr. A. W. Taylor (VK5AT) who discussed "Super Receivers for the Ultra Highs." Mr. Launce Deane (VK5LD) moved a vote of thanks to the lecturer which was received with acclamation.

Mr. Taylor, in his lecture, enumerated the various types and methods of frequency changers with particular reference to pentagrid converters and their unsuitability for use above 15 Mc. By means of circuits and graphs he proved theoretically that in an attempt to eradicate the inherent disadvantages of various frequency changers the constructor only succeeds in shifting the operating position of the tube along its conversion conductance curve. Suitable itermediate frequencies were discussed and the lecturer showed a decided preference for an I.F. of 1600 Kc. or higher. Mr. Taylor pointed out that the choice of an intermediate frequency was a matter of compromise between various conflicting factors. The lower the I.F. the higher the selectivity and gain with a consequent reduction in the image ratio. The low I.F. also increased the "pulling" effect between the oscillator and mixer. A high I.F. improves both image ratio and "pulling" with a reduction in gain and selectivity. The gain is of least consideration. The question of interelectrode capacities was explained at length with reference to the fact that at very high frequencies these capacitances became a larger part of the usable tuning capacity and the effect is further aggravated by the fact that the input loading increases rapidly at very high frequencies, so that ordinary tuned circuits have a very low effective Q when connected to the grid circuit of a valve. This was demonstrated by the fact that at 54 Mc. an inch of wire possessed an impedance of 10 ohms.

Two points in the lecture upon which Mr. Taylor lay stress are repeated here for those interested. The only satisfactory test of pentagrid converter efficiency is to insert a M.A. Meter in the oscillator grid circuit and, having obtained the current flowing through the grid resistor, by means of ohms law, the operating position of the oscillator on its conductance curve can be checked.

Lastly, when the oscillator is internal with the mixer the best setting of the oscillator condenser is on the low frequency side of the mixer whereas for external oscillators the high frequency side of the mixer is preferable.

The recent paragraph in the papers regarding the proposed lighting of an electric lamp in the U.S.A. by means of the light from a star, calls to mind the occasion about 12 years ago when a pre-arranged signal on 7 Mc. transmitted by Mr. Fred Carter, VK5GK, was used to automatically switch on all the lights in a large country hall in America thus officially opening a scientific convention.

The Custodian of the Frequency Meter, Mr. A. F. Wreford (VK5DW), announces that he is avaiable on Friday nights for frequency checks on the 40 meter band. Other times may be made by mutual arrangement, ring L 9677 (daytime only) for schedules.

Two new appointments to the Council are reported this month, Mr. Ross Harris (VK5FL) to the position of Assistant Secretary, and Mr. J. Kilgariff (VK5JT) as W.I.A.

Traffic Officer. Joe's experience in traffic handling made the Council's choice a logical one and Ross will relieve the Secretary of a good deal of work and help "Doc" to fully recover from his recent indisposition.

The present A.O.P.C. Classes are drawing to a close and anybody interested in the new classes which may possibly be starting in October are requested to contact the Hon. Secretary immediately.

Overheard one Ham mention that he was operating from his wife's pantry. In these days of housing shortages there must be many other unusual station locations. How about yours?

A new recruit to the Ultra Highs is Bob Keddie, of Woodville Park, who was heard contacting VK's 5RT, 5QR, 5KC, 5GB on 1.8 metres.

The same signals can be heard on 54 Mc. at various times and more stations would be welcomed on these frequencies because most 6 meter Hams reside in the northern suburbs which somewhat limits the DX.

WESTERN AUSTRALIA

Hon. Secretary: H. B. Lang,
42 Ord Street, Claremont, W.A.

Meeting Place: Builders' Exchange, St. Georges Ter., Perth.

Meeting Night. Third Monday in each Month.

The August General Meeting was held on Monday, the 19th, and will be remembered for the excellent attendance of members. If further increases are in evidence at future General Meetings it is obvious that more commodious rooms will have to be obtained.

The President, in declaring the meeting open, extended a very hearty welcome to VK3FW and PA0PX. General business was quickly dealt with and the rest of the evening was devoted to a lecture by Mr. I. Ginby, VK6IG.

The lecturer took as his subject "Navy Radio." It was evident that Mr. Ginby had devoted much time to the preparation of his lecture, which was highly instructive and was delivered in an interesting manner.

A vote of thanks was proposed by Mr. W. E. Coxon (VK6AG) and was carried in the usual manner.

The meeting closed at 10.45 p.m. and by 11 p.m. most members had departed for home.

Western Activity

VK6RG.—Ross now making a noise on "Ten." Getting some nice DX and has ideas on beam.

VK6MU.—Beautiful signal on 7 Mc. band. Mal sure packs a punch with his T40 final.

VK6HT.—Of Albany, is working both 10 and 20 Mx. Advises DX not so good. Intends changing antennas.

VK6RU.—In between DX contacts, extremely busy as QSL officer. Recently popped in on Jim and had an eyeful of the rig—commercial appearance. Excellent construction and decidedly effective. A real credit to the owner-operator.

VK6HL.—Has put up two element rotary on 10 Mx. Harry is convinced from the word "go." Still "burning" a channel between N.S.W. and VK6 with his daily sked with VK2AFE.

VK6KW.—Busy on rotary beam construction; has steel tower up 40 feet and it sure is a "honey." Ron still manages to be consistent on all bands despite the extra work.

VK6WH.—Still keeping 7 Mc. band alive in VK6. Has dozens of ideas on beam rotation and they sure work too—whose next Ted?

VK6WS.—Heard now and again on 14 Mc. fone. Has nice tower ready for beam. Incidentally "Skipper" was 72 years "Young" on 18th July—congrats OM.

VK6WZ.—Very QRL at the moment—not enjoying the best of health, but sure can find time to be active on 28 Mc.—mostly listening in vain for answers to his "plaintive" CQs. Thinking of adding another 807 to the final for P.P. and more power. Doesn't like D.C. mains—MUCH! (hi).

VK6EL.—Broken hearted over loss of three acorns overnight—no cause—no reason. Can manage 18 watts C.W. and about 16 fone.

VK6HM.—A real "sticker" for the "ultras." If we had more locals like Charlie, 20 Mx. would swap places with 50 Mc. so far as QRM goes.

VK6LW.—Very busy lately, but can usually be found on some band when time permits.

VK6DF.—Making some nice contacts on 10 Mx. and confining activity to this band.

VK6DD.—Still knocking them over on 14 Mc. Now has three antennas in operation, but as yet no rotary. Will you ever be convinced Johnny?

VK6PJ.—The latest to be on with fone permit. Reports DX very poor to date.

VK6SA.—Has been heard again on 14 Mc. C.W. and still busy on new Rx. and completing transmitter.

VK6MB.—Worked his first W! Is he pleased? Has keying troubles at the moment.

VK6KS.—Reappears with nice fone on 14.295 Mc. Is putting up 8JK rotary beam.

VK6XI.—Operating portable with 6V6 tritet and 807. Has nice fone on 14.250 Mc.

VK6RL.—Reports activity on 10 Mx. Rig is powered from 220 volts D.C. mains but still manages some nice DX even on QRP.

Conditions generally in VK6 have been very spasmodic. 10 Mx. is beginning to show its "teeth" once more. W signals in the early mornings are at excellent strength, but unfortunately the period is only short. Europeans break through every now and again to provide locals with some choice contacts. 20 Mx. provides some excellent QSOs with W and Island stations predominating. Europeans, in early afternoons, are weak but workable. Few contacts however can be classed as 100% QRM free. 7 Mc. band provides reliable and easy contact with the Eastern States, but here again QRM is the dominating factor. Fifty and higher has scant support in VK6. Those locals working these bands make up for the lack of numbers by their enthusiastic activity. Their efforts to popularise 50 Mc., which should be the ideal "local" band, is to be commended. How's about it fellows? Let's have more of you on 50 Mc.

Country members could assist greatly in compiling these notes. Drop a card to Box N1002, G.P.O. Perth, with some information on your activity.

TASMANIA

Secretary: J. Brown, VK7BJ,
12 Thirza Street, New Town. 'Phone W 1328.

Meeting place, Photographic Society's Rooms, 162 Liverpool Street, Hobart.

Meeting Night: First Wednesday of each month.

The August Monthly Meeting of the Division was held on Wednesday, the 7th. At the Council Meeting at 7.30 p.m. those present were L. Jensen (7LJ) in the chair, J. Brown (7BJ), A. Finch (7CJ), C. Walch (7CW), F. Gee (7RF), and A. Allen (7PA).

A wealth of correspondence was dealt with as was proposed constitutional alterations, these having been prepared previously at a special meeting of the Council held for that purpose and are now to be submitted to a special general meeting summoned to precede the next monthly meeting.

Five membership applications were received and recommended to the general meeting for acceptance.

General Meeting, 8 p.m.—Present: L. Jensen (7LJ) in the chair, other councillors as above, E. Nicholls (7RX), T. Allen (7AL), M. Loveless (7ML), D. Watson (7DW), R. O'May (7OM), W. Watson (7YY), C. F. Johnston (7AR) and son, M. Conway (7CL), Weeks, Clarke, Koglin, Richardson, Hughson. Apologies from F. Midhurst (7AH), R. Conrad (7TR), O. S. Dahl, A. Russell, T. Connor (7CT).

Correspondence on Disposals, Contest, R.S.G.B. representative, etc., from F.H.Q. read and received.

The five membership applications were put and elections were unanimous.

The chairman announced that owing to an unexpected change in arrangements Chas. Miller (7CM) had left hurriedly en route for England to take up his Rhodes Scholarship and that the presentation that was scheduled for this meeting had been made at short notice on the railway platform the morning he left.

It was not learned until the day before that he was to go next day and the Secretary made a hurried purchase of a clock, as had been suggested, and with one or two other members, summoned in a hurry, they duly presented it as stated on behalf of the gang. Regret was expressed at not being able to make it a general gathering and all expressed appreciation at the action taken under the circumstances.

An inscribed plate is to be prepared and forwarded for attachment as time did not permit this being done here.

One of the most interesting lectures to date was then given by Mr. Hughson—"Centimeter Radar in the Silent Service." Having lectured and instructed on this subject for a long period during hostilities the lecturer found no trouble in holding the interest of all throughout.

In tracing its progress from 1935 onwards he detailed the difficulties encountered, particularly for shipboard installations—space, weight, etc.—and the expedients used to overcome them, such that special gear had to be developed in most cases.

The use of infinite impedance supporting to overcome feeder insulation losses, the application of wave guides for energy transfer, the development and use of special valves, etc., were amongst the many exegencies discussed.

Exhibits included a magnetron and klystron and several other valves of special design for C/M use. At the conclusion a brief period for questions was taken advantage

of by several after which a vote of thanks, proposed by Mr. L. Jensen, was heartily tendered by acclamation and Mr. Hughson was assured that any thought he might have of boredom was not to be entertained, he having previously suggested the possibility.

Since last edition 7JH has had a fortnight laid up with a badly sprained ankle, this has delayed the "getting going," but we should hear him soon on 20 and 40 Mx. Sorry to hear of it OM and hope all is well again now.

Some congestion here at times in the narrow 20 and 40 Mx. channels especially when a certain local Ham decides to have a one, two, three test repetition and, overmodulated, splatters the band. I believe the Eastern States are after his blood, hi! He is using a commercial P.A. for modulators, I hear.

Another of the local phone lads on 20 Mx. is reputed to be giving some BCL interference in his locality—beware of the Vigilance Committee chaps. Received advice from Doug. Fisher (7AB), of Burnie, that things are moving on the Coast, several signals should be heard from there—7JT and 7AB now and 7CK and 7XL soon.

7XL is in Launceston at present and is building a rig fully relay protected, a la R.A.A.F. Doug tells us that Eric Trebilcock, well known pre-war S.W. listener and in DX and B.E.R.U. contests, is at Wynyard, operating the 'Drome station after a hectic time in New Guinea and Salamaua. Doug's rig is 6V6 Xtal, three stages, 807 doublers with Eimac T35 final and 6L6's P.P. modulator. He worked a TG9 on phone at first CQ. Happy hunting Doug and let's hear from you again soon.

7AL finally fired up a rig, has developed a V.F.O. using Xtal/E.C.O./mixer combination into an 807, says job is very stable and controls FB, has receiver perking well at last.

Several Southerners on regularly and migrating to 20 and 40 between QRM lapses of these channels.

Generally speaking, the new rigs here are tending towards compactness as against the old floor type rack and panel of pre-war days and certainly they have much to commend them.

Australian Hams are now permitted to use the 80 Mx. band. The allocation 3.5 to 3.8 Mc. became effective as from 1000 hours E.S.T. on the 1st September. This allocation will no doubt relieve the congested higher frequency bands, and the extension of the 7 Mc. allocation is hoped for in the near future.

The Radio Society of Great Britain has decided that, due to changed circumstances, it will be necessary to revise the rules governing the issue of W.B.E., H.B.E., and B.E.R.T.A. Certificates. In view of this decision no claims for such certificates can be accepted at present.

The R.S.G.B. announce that it is proposed to form a Radio Society of India. It is planned to operate the Society through Branch Managers, one for each of the main centres of activity.

New Barretter Available

Philips Electrical Industries of Australia announce that a new barretter type C8 is now available for replacement purposes. The C8 may be used as a direct replacement for C1 in existing AC/DC receivers fitted with "200 in A" valves. The C8 is electrically identical to the C1. In the new version however pins 1 and 2 are internally linked. This has no bearing on the operation as in both types the resistance element is connected to pins 3 and 6.

C8 is designed for operation in receivers in which the total heater voltage (series connected) is not less than 52 volts. The maximum voltage applied to the heater circuit must not exceed 250 volts when switching on. Regulating range is 80-200 volts for a heater current of 200 in A.

The C8 barretter can only be substituted for the C1 and other substitutions must not be attempted.

From a complete three stage rig on a single chassis little larger than a 30 watt P.A. to a table model two tier rack of nominal dimensions seems to be the aim.

Receivers in the main are home-made supers of the communications variety, some with R.F. stage and one or two I.F. stages of 455/465 Kc., and almost everything that opens and shuts.

One or two are specialising in the three or four tube simple super and a commercial or two are also evident.

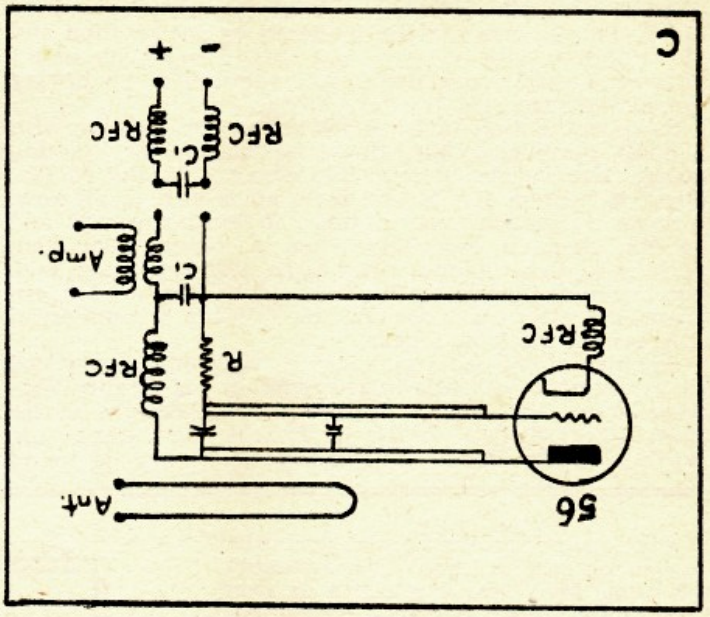
One or two ultra vernier dial elaborations are noteworthy. 73's de 7PA.

SIMPLE CIRCUIT FOR 166-170 MC.

It is self-explanatory. As shown it will generate a frequency close to 176 Mcs. The frequency may be lowered by increasing the length of the line slightly, or by introducing a small variable capacity across the line a short way up from the condenser end. A smaller frequency change can be obtained by making C a variable capacity about 100 mmfd.

Antenna Line: 5 7/8-inch of 1/4-inch copper, 1/2-inch between centres.
C = 0.00005 mfd.
C1 = 0.001 mfd.
R.F.C. is 16 B & S enamel, 12 turns 5/8-inch diameter, 5/8-inch long.
R = 10,000 ohms.
Return all Earths to one point.

With a plate voltage about 250 volts, the plate current



will be about 30 Ma., but it is not possible to give much indication here as the valve used in the original circuit was an old one of doubtful quality. However there was no trouble in obtaining oscillations, and a pea lamp, coupled to the "hair pin," can be lit quite well when

placed parallel to the copper line. The oscilator was quite stable and started instantaneously under load. It was not possible to obtain a measure of the useful output power, but 1 watt of useable power should be obtained, which is more than sufficient for suitable communication over good distances.

(b) As a Receiver. The oscillator can be used as a receiver by replacing the grid resistor by a resistor of 200,000 ohms. When this is done the receiver super regenerates very smoothly, it being better to have a fixed voltage on the plate and vary the loading of the aerial circuit to control the regeneration. The 56 in the receiver refused to super regenerate with less than 400 volts of plate potential, sometimes noticed with poor valves, but this can be overcome by the use of R.F. chokes, of the same dimensions as those above and connecting them as shown below. Super regeneration was then obtained with about 300 volts.

Tune the receiver with a small variable capacity across the line.

The receiver can be coupled to an amplifier in the usual way. Obtaining smooth regeneration will depend on effective earthing and considerably more attention needs to be given to this point than it was possible to give the original. Nevertheless, it was felt that when it was shown that it is quite possible to reach the 166-170 Mcs. band with a standard valve, others withholding action on account of lack of suitable equipment would take new heart and carry on the good work that is commenced here, resulting in a fuller occupancy of the band than is the case at the present time. In conclusion, a duplicate of this circuit was constructed independently and found to work satisfactorily, both as a receiver and as an oscillator.

Propagation Predictions For September

The following information is extracted from the Radio Propagation Bulletin for September, 1946, No. A.R.P.C.-A21, published by the Australian Radio Propagation Committee.

Zone E.—Latitude 10° South—(North Queensland, Northern Territory, North Western Australia):—

28 Mc.—From 0700 hours skip should be in the vicinity of 2,500 miles until around 1600 hours when this frequency should cease to be of any value for DX.

14 Mc.—From midnight till 0200 hours skip increases from 1,000 miles to 2,500 miles after which time and until 0600 hours the band suffers a fade out. At 0600 hours skip is once again 2,500 miles, which distance gradually decreases until at noon it is in the vicinty of 500 to 600 miles.

7 Mc.—Shows a peak of 1,500 miles skip at 0400 hours, apart from which it doesn't offer much possibility for long distance working.

Zone E.—Latitude 20° South—(Southern Queensland, New South Wales, South Australia, Southern Western Australia):—

28 Mc.—Except for a short period of 2,500 miles skip between 0900 hours and 1300 hours, 28 Mc. doesn't look too bright for DX.

14 Mc.—Comes to life at about 0600 hours with skip of 2,500 miles, which steadily decreases until at 1100 hours it is approximately 700 miles. After this however, it gradually increases until at midnght it is approximately 2,000 miles. The only period when 14 Mc. is unsuitable for DX is between 0200 hours and 0500 hours.

7 Mc.—Seems useful from midnight till around 0600 hours and again from 1500 hours till midnight. Skip distance varies, but never at any time exceeds 1,000 miles.

Zone E.—Latitude 30° South—(Victoria, Southern New South Wales, Southern South Australia and Southern Western Australia):—

28 Mc.—Not very bright at all. May possibly be useful around noon for a very short period of 2,500 miles skip.

14 Mc.—Opens up at 0600 hours with skip distance at 2,500 miles after which it decreases until at noon it is around 700 miles, then skip increases until it reaches a maximum of 2,500 miles at 2200 hours. Only doubtful period is between 0200 hours and 0600 hours.

7 Mc.—Useful until 0700 hours for skip distances up to a maximum of 1,000 miles. Comes good again at 1700 hours.

Zone E.—Latitude 40° South—(Tasmania):—

28 Mc.—Similar conditions apply here as in the previous case. Although the charts do not look promising, there may be a short period of 2,500 miles skip around about noon.

14 Mc.—Opens up at 0700 hours with skip at 2,500 miles, which decreases to 800 miles at noon. Then from noon onwards skip steadily increases to a maximum of 2,500 miles at 2100 hours.

7 Mc.—Should be quite useful up till 1100 hours and again from 1700 hours till midnight.

Our copy of the Radio Propagation Bulletin No. A.R.P.C.-A21 for September, 1946, by courtesy of the Australian Radio Propagation Committee. Copies may be obtained from all newsagents and booksellers priced 2/- per copy. Wholesale distributors are Gordon and Gotch (A'Sia) Ltd.

CLEARING THE ETHER.

(iii) Separate anode and grid tanks can be correctly matched to tubes employed.

(iv) Permits transmitter to be constructed as separate units, facilitating maintenance, switching and economy.

In operaion the excitation is adjusted by either changing physical relationship of link to tank coil, or by changing the number of turns in the link. The former method is correct method to employ in a transmitter designed to operate at more than one frequency.

FOR SALE, EXCHANGE, WANTED

9d. per line, minimum 2/-.

FOR SALE.—Bliley 465 Kc. Filter Xtal new, mtd., £3. METERS: Triplett 2-inch 0-500 volts A.C./D.C. £2; Radio Corp. 2-inch 0-10 Ma., 15/-; 2 Weston 2-inch 0-150 Ma., 35/- each; 1 Hickok 3-inch 0-50 Ma., 25/-; 1 Readrite 0-100 Ma., 12/6; 1 Readrite 0-200 Ma., 12/6; 1 new University 4-inch square 100 microamps with multi volts, ohms scale, suit V.T.V.M., 77/6; 2 new Palec 3-inch 0-100 Ma., 50/- each; and the following Weston 301 3-inch bakelite cased milliammeters: 4 0-100 Ma., 2 0-50 Ma., 1 0-25 Ma., 50/- each; University ERT ohmmeter with prods, as new £5; Calstan AC202 Valvetester £10; Clough-Brengle battery model OD mod. oscillator 50 Kc. to 30 Mc. in six ranges, with charts and instructions, £15; small oblong D/W dial new, 7/6; 2 801 ceramic base tubes as new £1 each; 4 type 10 7/6 each; over a dozen speakers 5-inch to G12 with new isocore transformers to suit you, inquiries invited. All gear guaranteed good order and condition. Please add freight and exchange. B. R. MANN, VK3BM, Quambatook, Victoria.

WANTED TO SELL.—Two EIMAC 50T valves in new condition £4 each. Complete portable transmitter-receiver (less batteries) in leather carrying case, receiver 3 valve TRF, transmitter two-stage CC vibrator powered, covers 80, 40, 20. This equipment won two National Field Day Contests and operating portable has worked 28 countries, W.A.C. and W.B.E. Full technical details on request, Price £17/10/-. VK3UK, 75 Argyle Road, Kew, E.4, Victoria, Hawthorn 4596.

WANTED.—Super, suitable for 28 Mc. and 14 Mc. operation. Send particulars to VK3BG, 11 Mitchell Street, Bendigo.

COMMUNICATION RECEIVER AMR200, Super-Pro copy, 15 tubes. Complete with tubes, tested and aligned £110 less speaker. Only two left. VK3KM (FJ 1339).

FOR SALE.—Pre-war radio gear—C.R. oscilloscope with Philips DG7-1 and time base, amplifiers, power packs, audio oscillator, meters, valves, parts, etc. Mattingley, 113 Rowell Ave., Camberwell (WM 3719).

METERS.—0-50 microamp., 4-inch, British Pullin, uncalibrated £3/10/-. Similar 0-1 milliamp., £2. 0-1 milliamp. 3-inch, £1/10/. M. C. Radcliffe, 60 Elimatta St., Braddon, Canberra.